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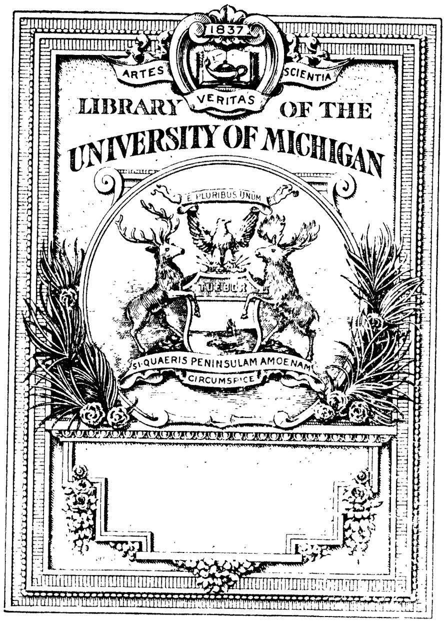
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THE PHILIPPINE
JOURNAL OF SCIENCE

EDITED BY

PAUL C. FREER, M. D., PH. D.

CO-EDITORS

RICHARD P. STRONG, PH. B., M. D.
H. D. McCASKEY, B. S.
E. D. MERRILL, M. S.

PUBLISHED BY

THE BUREAU OF SCIENCE
OF THE
GOVERNMENT OF THE PHILIPPINE ISLANDS

VOL. I SUPPLEMENT

1906

WITH 33 PLATES

MANILA
BUREAU OF PRINTING
1906

49082

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THE PHILIPPINE JOURNAL OF SCIENCE.

BUREAU OF SCIENCE.

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Remittances should be made to the DIRECTOR OF PRINTING, **MANILA, P. I.**

THE PHILIPPINE

JOURNAL OF SCIENCE

VOL. I APRIL 15, 1906 SUPPLEMENT I

THE FLORA OF THE LAMAO FOREST RESERVE.

By ELMER D. MERRILL.

(*From the Botanical Section of the Biological Laboratory, Bureau of Science.*)

INTRODUCTION.

The Lamao Forest Reserve was established in October, 1903, as a permanent station for the working out of various problems presented by the Philippine forests, and, as a preliminary to other investigations, an attempt has been made to enumerate the constituent species of the flora of the reserve. Although, at this time, it has been impossible to determine all the material collected within its limits, the present paper has been prepared to supplement a forthcoming article, entitled "The Vegetation of the Lamao Forest Reserve," by Dr. H. N. Whitford, formerly of this Bureau. The reader is referred to Dr. Whitford's paper, which is to appear in this JOURNAL in the near future, for a map of the region, illustrations of vegetative types, geology and physiography, climate, humidity, temperature, soil, and an extensive ecological discussion of the various types of vegetation and the plant formations. To make the present article as nearly as possible complete in itself and for the benefit of those who may not have access to Dr. Whitford's work, the following passages are quoted from the introduction of his paper:

"The portion of Mount Mariveles with which this paper deals (the Lamao River Reserve) lies on its eastern slope and comprises an area of approximately 4,426 hectares. It is known as the Lamao River Reserve and has a water frontage on Manila Bay of nearly 5 kilometers, extending from Cape Magarhas on the south, in a northerly direction, to Cape Quitang. These two points mark the lower ends of the main ridges which, respectively, are the northern and southern boundaries of the reserve."

"The northern ridge extends from Cape Quitang westward on the ridge leading to Buenavista Peak (altitude, 1,165 meters); from thence it follows the rim of the crater to Cabcaben Peak (altitude, 1,406 meters). The southern boundary is the ridge which starts at Cape Margahas and runs through Limay Peak to Caybubu Peak (altitude, 1,368 meters) and on the rim of the crater. The western and northwestern boundaries of the reserve are formed by lines which descend from Cabcaben on the south and Caybubu on the north, meeting at the bottom of the crater, near the headwaters of the Balanga River."

"Between the north and south ridges are two main rivers—the Lamao and the Alangan. The Lamao River rises just south of the lowest point of the rim of the crater which connects Buenavista with Caybubu Peak. From its source down to within 3.5 kilometers of the shore it lies in a cañon which varies in depth from 75 to 270 meters; below 3.5 kilometers the latter feature of the river disappears."

"The group of peaks known as Mount Mariveles is on the southern end of the peninsula of land comprising the Province of Bataan, of the Island of Luzon. The meridian of 120° 30′ east of Greenwich and the parallel of 14° 30′ north latitude intersect the mountain near its summit. Rising to the height of approximately 1,400 meters, it, with the Island of Corregidor, is the most conspicuous feature of the landscape at the entrance of Manila Bay."

"The lithographic structure of Mount Mariveles shows it to be of volcanic origin. It is a mass composed largely of andesitic ejecta and of the decomposition products thereof. The physiographic features which point to its being an extinct volcano are almost as striking. Rising from Manila Bay on the east, from the China Sea on the south and west, and from the lowlands near the central part of Bataan on the north, are a series of prominent ridges ending in peaks, which, with their connecting ridges, form a nearly circular chain—the rim of the former crater which has an outlet to the north, by way of the Balanga River. Between these peaks and just beneath the lowest point of the connecting ridges are the sources of the main rivers draining the mountain; the latter have cut deep cañons and have established many branches with smaller ones."

The general vegetative conditions of the Lamao Forest Reserve are characteristic of large portions of the Philippines. From the coast, the land slopes gradually upward, reaching an elevation of about 100 meters at a distance of about 4.5 kilometers, where the sharper slopes of the mountain are encountered. This gently sloping plain region is covered with dense bamboo thickets and low, scrubby forests or thickets, consisting of numerous species of small trees and shrubs, with an intermixture of erect and scandent bamboo, vines, etc., and very few scattered large trees, while here and there are open, grassy parks of varying size. Occasionally one finds traces of cultivation and it is possible that much of this plain region has been cultivated at one time or another. At the distance from the coast and at the altitude mentioned above there is an abrupt change in the character of the vegetation, the bamboo and scrubby thickets for the greater part giving place to the high forest, the transition usually being sharp and well defined. The high forest, commencing at the upper limits of the thickets, extends without a break to the summit of the mountain, although the character of the vegetation at the higher altitudes is very different from that below, not only in constituent species but also in general appearance. In the typical dipterocarp forests on the lower slopes, mosses, lichens, epiphytes, ferns, and herbaceous plants are comparatively scarce, while the trunks and branches of trees on the exposed, wind-swept ridges above 900 or 1,000 meters are more or less densely covered with many species of mosses and lichens, ferns, orchids, and other epiphytic plants, and the trees themselves are more or less dwarfed, according to their exposure. The ground on these ridges is, for the greater part, densely covered with various species of mosses; herbaceous plants are also more abundant than in the high forests at lower altitudes. In the accompanying paper I have referred to plants found in this location as growing in the mossy forest on exposed ridges. Few of the species found in this habitat extend downward into the high forest, and, when they do, they are usually found in the deep, damp ravines and cañons, and not on the steep slopes.

ORIGIN OF MATERIAL.

The material on which the present paper is based has all been collected within the past two and one-half years, and is deposited in the herbarium of this Bureau. It has been received from the following sources:

Forestry Bureau, by direction of Capt. G. P. Ahern, Chief of Bureau.

	Numbers.
Ahern's collector, Ramos, July–August, 1904	98
Barnes, P. T., October, 1903, to April, 1904	313
Borden, T. E., April, 1904, to May, 1905	1,190
Leiberg, J. B., July, 1904	160
Meyer, R., December, 1904, to June, 1905	435
Total	2,196

Bureau of Science.

Copeland, E. B., mostly ferns and fungi (about)	200
Elmer, A. D. E., November, 1904	302
Merrill, E. D., June, October, 1903; January, 1904; March, 1905	575
Whitford, H. N., April to July, 1904; December, 1904, to May, 1905; September, 1905	892
Total	1,969

Miscellaneous.

Topping, D. Le Roy, May, 1904, presented (about)	100
Aggregate	4,265

In addition to the above numbers, most of which are cited in the present paper, approximately 3,000 sterile numbers have been received from Lamao in the past two years, from the collections of Borden, Meyer, and Whitford. Sterile material was collected by the former two in prosecuting certain investigations for the Forestry Bureau, while that secured by Whitford was for the purpose of determining the constituent species of certain areas, and is discussed by him in his forthcoming paper. This material is not considered in the present paper except in a few instances when it was derived from certain species which could accurately be identified, and which were not found in flower or fruit.

It is admitted that a considerable percentage of the species actually found within the limits of the reserve is not enumerated. In some cases material sent to specialists has not been identified by them in time to be incorporated in the present paper and, as their reports have not been received, the author has not felt at liberty to work on such material. In other cases, such as in the *Euphorbiaceæ*, several species are represented by imperfect specimens which, at present, render accurate identification impossible. In the sterile material collected by Borden, Meyer, and Whitford and not found in fruit or flower, a certain proportion of species occur which I have been unable even to refer to their proper families. Owing to the methods employed in collecting, many species are now represented in our herbarium by numerous specimens, while others, rather common at Lamao, by but one or two. It is very probable that some common species, especially of herbaceous and weedy plants, are still unrepresented in our collections, and that future botanizing in this region will add a considerable number to the present list.

Warburg, Vidal, and Loher have collected on Mount Mariveles, but all three apparently used the town of Mariveles as a base and none of them entered the limits of the Lamao Forest Reserve, unless it might possibly have been along the upper boundary ridges, above an altitude of 1,000 meters. Vidal's specimens from Mount Mariveles are cited in his "Revisión de Plantas Vasculares Filipinas," some of Warburg's in his "Monsunia," and some in Perkins' "Fragmenta Floræ Philippinæ" and other papers by various authors. Loher's material, although it is in greater part identified, has been but little cited, as it has been collected at a comparatively recent date. Mr. R. S. Williams, collector for the New York Botanical Garden, spent several months at Lamao in 1903–4. He made an extensive collection within the limits of the Lamao Forest Reserve, but his material is at the New York Botanical Garden and it has not, as yet, entirely been classified, so that it is not available for enumeration in the present paper.

SEQUENCE AND NOMENCLATURE.

The sequence of families and genera is that adopted by Engler and Prantl in their *Natürlichen Pflanzenfamilien*, and without exception the families are enumerated without change in nomenclature or terminology. In reference to generic nomenclature, some changes have been found to be necessary, as I have followed the action of the Vienna Botanical Congress and accepted Harms's list of *nomina conservanda*.[1] Specific nomenclature in greater part follows standard monographs, but in some cases old names are adopted, and in others it has been found necessary to propose new ones on account of preoccupation. Citations are generally to standard monographs and floras where descriptions of the species are to be found. No attempt has been made to cite the original publications of all the species. Distributions of species have been compiled from various authentic sources, monographs, etc. Native names are cited in all instances when they were secured by collectors, names in actual use by the natives of the region alone being given.

In the following paper 611 genera and 1,151 species and varieties are enumerated, all found within the limits of the Lamao Forest Reserve. The material comprises *Musci* (*Bryophyta* and *Hepaticæ*), vascular cryptogams, and flowering plants, but not the fungi, algæ, and lichens. The fungi have in part been identified by Mr. P. L. Ricker, of the United States Department of Agriculture, and many genera and species of various families are represented. None of the lichens have as yet been identified, although the same is true in regard to them, especially at the higher altitudes. Both marine and fresh-water algæ are very poorly represented at Lamao.

Summary.

Orders and families.	Genera.	Species and varieties.	Endemic species.	Intro-duced species.	Woody plants.	Scandent shrubs.	Trees.
HEPATICÆ	8	11					
MUSCI	16	23	3				
FILICALES:							
Hymenophyllaceæ	2	8					
Polypodiaceæ	37	99	15				
Cyatheaceæ	2	2	1		1		1
Gleicheniaceæ	1	2	1				
Schizaeaceæ	1	3					
MARATTIALES:							
Marattiaceæ	2	2					
OPHIOGLOSSALES:							
Ophioglossaceæ	2	4					
LYCOPODIALES:							
Lycopodiaceæ	1	6					
Selaginellaceæ	1	6	?				
CYCADALES:							
Cycadaceæ	1	1			1		1
CONIFERÆ:							
Taxaceæ	1	2			2		2
Pinaceæ	1	1	1		1		1
GNETALES:							
Gnetaceæ	1	2			2	1	1

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[1] *Notizblatt Kgl. Bot. Gart. und Mus. Berl.* (1904), App. **13**, 9–37.

Summary—Continued.

Orders and families.	Genera.	Species and varieties.	Endemic species.	Introduced species.	Woody plants.	Scandent shrubs.	Trees.
PANDANALES:							
Pandanaceæ	2	7	6		7	3	3
GLUMIFLORÆ:							
Gramineæ	26	49	6	2	8	2	
Cyperaceæ	8	23	3				
PRINCIPES:							
Palmæ	6	11	9	1	11	5	5
SPATHIFLORÆ:							
Araceæ	8	12	6		3	3	
FARINOSÆ:							
Flagellariaceæ	1	1			1	1	
Bromeliaceæ	1	1		1			
Commelinaceæ	5	7					
Pontederiaceæ	1	1					
LILIIFLORÆ:							
Liliaceæ	4	5	2		3	2	1
Amaryllidaceæ	1	1					
Taccaceæ	1	1					
Dioscoreaceæ	1	3	1		1		
SCITAMINEÆ:							
Musaceæ	1	3					
Zingiberaceæ	6	9	6				
Cannaceæ	1	1		1			
Marantaceæ	1	1			1		
MICROSPERMÆ:							
Orchidaceæ	20	32	25				
PIPERALES:							
Piperaceæ	2	8	3(?)		2		
Chloranthaceæ	1	2			2		
MYRICALES:							
Myricaceæ	1	1			1		1
JUGLANDALES:							
Juglandaceæ	1	2	1		2		2
FAGALES:							
Fagaceæ	1	6			6		6
URTICALES:							
Ulmaceæ	4	5	3		5		5
Moraceæ	6	41	20		41	11	30
Urticaceæ	7	12	9		6		6
PROTEALES:							
Proteaceæ	1	2	2		2		2
SANTALALES:							
Loranthaceæ	2	5	?		5		
Santalaceæ	1	1			1	1	
Opiliaceæ	2	2			2	1	1
Olacaceæ	2	2	1		2	1	1
Balanophoraceæ	1	1	1				
ARISTOLOCHIALES:							
Aristolochiaceæ	1	1	1				
CENTROSPERMÆ:							
Amarantaceæ	4	5			2	2	
Aizoaceæ	1	1					
RANALES:							
Menispermaceæ	5	6	1		6	6	
Magnoliaceæ	3	3	2		3		3

Summary—Continued.

Orders and families.	Genera.	Species and varieties.	Endemic species.	Introduced species.	Woody plants.	Scandent shrubs.	Trees.
RANALES—Continued.							
Anonaceæ	12	22	14	--------	22	6	16
Myristicaceæ	4	6	6	--------	6	--------	6
Monemiaceæ	1	1	1	--------	1	--------	1
Lauraceæ	8	13	8	--------	13	--------	13
RHODEALES:							
Hernandiaceæ	1	1	1	--------	1	1	--------
Capparidaceæ	3	6	2	1	5	5	--------
Moringaceæ	1	1	--------	1	1	----	1
SARRACENALES:							
Nepenthaceæ	1	1	1	--------	--------	--------	--------
ROSALES:							
Crassulaceæ	1	1	--------	--------	--------	--------	--------
Saxifragaceæ	3	3	3	--------	3	--------	3
Pittosporaceæ	1	3	3	--------	3	--------	3
Cunoniaceæ	1	1	1	--------	1	--------	1
Rosaceæ	5	7	2	--------	6	1	4
Connaraceæ	5	6	4	--------	6	5	1
Leguminosæ	38	68	10	13	41	15	26
GERANIALES:							
Oxalidaceæ	2	2	--------	1	1	--------	1
Rutaceæ	10	13	5	--------	13	--------	13
Simarubaceæ	2	3	3	--------	3	--------	3
Burseraceæ	2	5	5	--------	5	--------	5
Meliaceæ	8	19	17	--------	19	--------	19
Malpighiaceæ	2	2	1	--------	2	2	--------
Polygalaceæ	2	2	1	--------	1	--------	1
Dichapetalaceæ	1	1	1	--------	1	--------	--------
Euphorbiaceæ	29	61	26	2	47	2	43
SAPINDALES:							
Buxaceæ	1	1	1	--------	1	--------	1
Anacardiaceæ	7	13	5	3	13	--------	13
Celastraceæ	1	1	--------	--------	1	1	--------
Hippocrateaceæ	2	3	1	--------	3	3	--------
Staphyleaceæ	1	1	--------	--------	1	--------	1
Icacinaceæ	2	2	1	--------	2	--------	2
Aceraceæ	1	1	1	--------	1	--------	1
Sapindaceæ	11	16	11	--------	16	--------	16
Sabiaceæ	1	1	?	--------	1	--------	1
RHAMNALES:							
Rhamnaceæ	2	3	2	--------	3	1	2
Vitaceæ	2	11	2	--------	11	8	3
MALVALES:							
Elaeocarpaceæ	1	2	1	--------	2	--------	2
Gonystylaceæ	1	1	--------	--------	1	--------	1
Tiliaceæ	4	7	1	1	5	--------	5
Malvaceæ	8	17	--------	5	7	1	2
Bombacaceæ	2	2	--------	1	2	--------	2
Sterculiaceæ	11	17	7	1	15	--------	14
PARIETALES:							
Dilleniaceæ	3	4	3	--------	4	1	3
Theaceæ	5	5	4	--------	5	--------	5
Guttiferæ	4	8	6	--------	8	--------	8
Dipterocarpaceæ	5	9	7	--------	9	--------	9

Summary—Continued.

Orders and families.	Genera.	Species and varieties.	Endemic species	Introduced species.	Woody plants.	Scandent shrubs.	Trees.
PARIETALES—Cont'd.							
Bixaceæ	1	1		1	1		1
Flacourtiaceæ	4	8	6		8		8
Passifloraceæ	1	2	?				
Caricaceæ	1	1		1	1		1
Datisaceæ	1	1			1		1
Begoniaceæ	1	2	2				
MYRTIFLORÆ:							
Thymeliaceæ	2	4	4		4		2
Elæagnaceæ	1	1			1	1	
Lythraceæ	1	1			1		1
Sonneratiaceæ	2	3	1		3		3
Lecythidaceæ	2	3	2		3		3
Rhizophoraceæ	6	6	2		6		6
Combretaceæ	3	7	4		7	2	5
Myrtaceæ	5	26	17	1	26		26
Melastomataceæ	4	15	12		15	3	9
Oenotheraceæ	2	2					
UMBELLIFLORÆ:							
Araliaceæ	3	7	3		7	3	4
Umbelliferæ	2	2					
Cornaceæ	2	2	1		2		2
ERICALES:							
Clethraceæ	1	1	1		1		1
Ericaceæ	2	6	6		6		5
PRIMULALES:							
Myrsinaceæ	6	14	11		14	5	5
EBENALES:							
Sapotaceæ	4	11	10		11		11
Ebenaceæ	1	5	4		5		5
Symplocaceæ	1	5	4		5		5
CONTORTÆ:							
Oleaceæ	3	7	6		7	1	6
Loganiaceæ	4	4	2		3	2	1
Apocynaceæ	14	15	9		15	7	7
Asclepiadaceæ	6	8	7		2	2	
TUBIFLORÆ:							
Convolvulaceæ	6	13	2	3	3	3	
Borraginaceæ	4	5	2		4	1	3
Verbenaceæ	7	20	10		19	1	8
Labiatæ	5	7	2	3			
Solanaceæ	3	7	1	2	1		
Scrophulariaceæ	5	7					
Bignoniaceæ	2	2	1		2		2
Pedaliaceæ	1	1		1			
Gesneriaceæ	2	2	2		3		
Acanthaceæ	13	18	7	1	4		
RUBIALES:							
Rubiaceæ	25	54	35		47	6	28
Caprifoliaceæ	2	3	2		3		1
CAMPANULATÆ:							
Cucurbitaceæ	5	6	2	2			
Compositæ	10	17	2	5	3		2
Total	611	1,151	479	54	686	127	548

In examining the above summary it will be noted that 611 genera and 1,151 species and varieties are enumerated from an area of approximately 4,426 hectares. The vascular cryptogams and flowering plants are distributed into 138 families and 584 genera, 1,114 species and varieties being represented. So far as can be determined at this time, 479 species, or 41 per cent of the total number found in the reserve, are endemic to the Philippines, thus emphasizing the insular character of the vegetation; 54 have apparently been introduced, although it is frequently difficult to determine this point and the greater proportion of the latter class are so well established that they must be considered to be constituents of the Philippine flora. Six hundred and eighty-six species, or nearly 60 per cent of the total number, are woody plants—that is, trees, shrubs, scandent shrubs, or undershrubs. Of these, 485, or 42 per cent of the total, are trees; thus the arborescent character of the vegetation is strongly marked. In this classification all plants which in their period of growth may reach a height of 5 or 6 meters, or more, and which have a well-defined trunk and woody tissue, have been considered to be trees. Shrubs and undershrubs are represented by 74 species, and scandent shrubs by 127. Four hundred and sixty-five species are herbaceous, although it has frequently been difficult to define the difference between herbaceous and woody plants. *Musci, Hepaticæ, Filices, Gramineæ, Orchidaceæ*, and *Cyperaceæ* account for a large percentage of these, but many of the ferns here classified as herbaceous plants are decidedly woody in character.

ACKNOWLEDGMENTS.

To the following botanists I am under obligation for the identification of material which has made the publication of this paper possible at the present time: Dr. V. F. Brotherus, Helsingfors, Finland, *Musci*; Dr. A. W. Evans, New Haven, Conn., U. S. A., *Hepaticæ*; C. B. Clarke, esq., Kew, England, *Cyperaceæ*, and *Acanthaceæ*; Dr. O. Beccari, Florence, Italy, *Palmæ*; Dr. A. Engler, Berlin, *Araceæ*; Oakes Ames, esq., North Easton, Mass., U. S. A., *Orchidaceæ*; H. N. Ridley, Singapore, *Zingerberaceæ;* Dr. O. Warburg, Berlin, Germany, *Myristicaceæ;* Maj. D. Prain, Calcutta, India, *Leguminosæ;* Dr. L. Radlkofer, Munich, Germany, *Sapindaceæ;* Dr. A. Brand, Frankfort a. d. Oder, Germany, *Simplocaceæ*. To Sir William T. Thistleton-Dyer, late director of the Royal Gardens, Kew, England, I am indebted for some specific miscellaneous identifications and comparisons with types. Dr. E. B. Copeland, formerly of this Bureau, has determined the vascular cryptogams which are enumerated, and Mr. A. D. E. Elmer, also at one time connected with this Bureau, has partly identified the *Rubiaceæ* and *Compositæ*. To Capt. G. P. Ahern, Chief of the Forestry Bureau, I am indebted for extensive collections of material, made under his direction by employees of his Bureau, and for various courtesies extended to myself and other members of this Laboratory during the prosecution of the investigations leading to the preparation of this paper.

ASIPHONOGAMA.

BRYOPHYTA.

HEPATICÆ.[2]

MARCHANTIALES.

MARCHANTIACEÆ.

1. **MARCHANTIA** (L.) Raddi.

1. **M. emarginata** Reinw. Bl. et Nees.; Schiffner Consp. Hepat. Arch. Ind. (1898) 47.

(288 *Whitford*) May. On damp rocks in ravines at 800 m. Malaya.

JUNGERMANIALES.

JUNGERMANIACEÆ ANAKROGYNÆ.

1. **RICCARDIA** S. F. Gray.

1. **R. parvula** Schiffn.?

(3524 *Merrill*) October. On wet bowlders in streams.

JUNGERMANIACEÆ AKROGYNÆ.

1. **BAZZANIA** S. F. Gray.

1. **B. erosa** (Reinw. Bl. et Nees) Trevis; Schiffner l. c. 154.

(3519 *Merrill*) October. On trees, exposed ridges above 1,000 m. Malaya.

2. **B. praerupta** (Reinw. Bl. et Nees) Trevis; Schiffner l. c. 169.

(3517 *Merrill,* in part) October. On trees, exposed ridges above 1,000 m. British India to Malaya.

2. **LEPIDOZA** Dum.

1. **L. trichodes** (Reinw. Bl. et Nees) Lindenb.; Schiffner l. c. 192.

(3539 *Merrill*) October. On trees, exposed ridges above 1,000 m. Malaya to Tahiti and (?) Central America.

3. **MASTIGOPHORA** Nees.

1. **M. diclados** (Brid. et Web.) Nees; Schiffner l. c. 202.

(3522 *Merrill*) October. On trees, exposed ridges above 1,000 m. Tropical Africa and Asia to Malaya, Polynesia, Samoa, and Tahiti.

4. **SCHISTOCHILA** Dum.

1. **S. aligera** (Nees) Schiffn. l. c. 211.

(263 *Copeland*) January; (3518 *Merrill*) October. On trees, exposed ridges above 1,000 m. British India to Malaya and Polynesia.

5. **PTYCHANTHUS** Nees.

1. **P. striatus** (Lehm. et Lindenb.) Nees.; Schiffner l. c. 315.

(187 *Whitford*) May. On rocks and logs in forests at 600 m. Madagascar to British India and Malaya.

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[2] Determined by Dr. A. W. Evans, New Haven, Conn., U. S. A.

6. FRULLANIA Raddi.

1. **F. integristipula** Nees; Schiffn. l. c. 328.
(3517 *Merrill*, in part) October. On trees, exposed ridges above 1,000 m. Java and Sumatra.
2. **F. orientalis** Sande Lac.; Schiffn. l. c. 335.
(3520 *Merrill*) October. On trees, exposed ridges above 100 m. Java.

ANTHOCEROTALES.

ANTHOCEROTACEÆ.

1. ANTHOCEROS Linn.

1. **A. grandis** Angstr.; Schiffner l. c. 351.
(261, 1100 *Whitford*) May, February. On wet rocks in cañon of the Lamao river 600 to 800 m., and during the wet season in borders of thickets below 100 m. Amboina and Tahiti.

MUSCI.

BRYALES.[3]

DICRANACEÆ.

1. DICRANOLOMA.

1. **D. blumei** (Nees) Ren.
(3557 *Merrill*) October. On trees above 1,200 m. Ceylon to Java and New Guinea.

LEUCOBRYACEÆ.

1. LEUCOBRYUM Hampe.

1. **L. sanctum** Hampe.
(3540, 3549 *Merrill*) October. On trees above 1,200 m. Nepal to Malaya, New Guinea, Samoa, and Fiji.
2. **L. javense** (Brid.) Mitt.
(3550 *Merrill*) October. With the preceding. British India to Japan and Malaya.
3. **L. angustifolium** Wils.
(3548 *Merrill*) October. With the preceding. Ceylon to Malaya and Celebes.

2. OCTOBLEPHARUM Hedw.

1. **O. albidum** (L.) Hedw.
(3681 *Merrill*) January. On prostrate logs in forests. Tropics of the world.

FISSIDENTACEÆ.

1. FISSIDENS Hedw.

1. **F. zollingeri** Mont.
(3560 *Merrill*) October. On damp earth banks at 100 m. Java.
2. **F. zippelianus** Doz. et Molk.
(3554, 3555 *Merrill*) October. On damp shaded banks at about 100 m. Ceylon to Hongkong, Malaya, and New Guinea.

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[3] (Compiled from Brotherus "Contributions to the Bryological Flora of the Philippines, I." *Finska Vetenskaps-Societetens Förhandlingar* (1904–5) **47**, No. 14: 1 to 12.)

ORTHOTRICHACEÆ.

1. MACROMITRIUM Brid.

1. **M. salakanum** C. Mull.
(433 *Whitford*) June. On trees in forests at 850 m. Java.
2. **M. cuspidatum** Hampe.
(740 *Borden*) June. On trees at 1,020 m. Borneo to Java and Sumatra.
3. **M. reinwardtii** Schwaegr.
(3558 *Merrill*) October. On trees above 1,200 m. Java and Borneo to Tasmania and Tahiti.

FUNARIACEÆ.

1. FUNARIA Schreb.

1. **F. calvescens** Schwaegr.
(157 *Whitford*) May; (3678 *Merrill*) January; (1409 *Copeland*) August; (6854 *Elmer*) November. On recently burned-over lands near the summit of the mountain. Tropical and subtropical regions of the world.

BRYACEÆ.

1. BRYUM Dill.

1. **B. coronatum** Schwaegr.
(3556 *Merrill*) October. On damp shaded banks in forests. Tropics generally.

RHIZOGONIACEÆ.

1. RHIZOGONIUM Brid.

1. **R. spiniforme** (Linn.) Bruch.
(3548, 3679 *Merrill*) October, January. On trees above 1,200 m. Tropical and subtropical regions of the world.

POLYTRICHACEÆ.

1. POGONATUM.

1. **P. albo-marginatum** (C. Mull.)
(3680 *Merrill*) January; (1410 *Copeland*) August. On bare soil of slides and on recently burned-over ground above 1,000 m. Malaya to Celebes and New Guinea.

SPIRIDENTACEÆ.

1. SPIRIDENS Nees.

1. **S. reinwardtii** Nees.
(266 *Copeland*) January; (3542, 3547 *Merrill*) October; (4447 *Whitford*) June. On trees, exposed ridges above 1,000 m. Malaya to Celebes and New Guinea.

NEKERACEÆ.

1. AEROBRYUM Doz. et Molk.

1. **A. lanosum** Mitt.
(3551 *Merrill*) October. On trees, exposed ridges above 1,000 m. British India to Amboina and Celebes.

SEMATOPHYLLACEÆ.

1. **SEMATOPHYLLUM** Mitt.

1. **S. hyalinum** (Reinw.) Jaeg.
(741 *Borden*) June; (3541, 3546, 3682 *Merrill*). On prostrate logs and trees, forests and exposed ridges above 500 m. Malaya to Celebes.
2. **S. alto-pungens** (C. Mull.) Jaeg.
(230 *Whitford*) May. On bowlders above 1,000 m. Endemic.

2. **TAXITHELIUM** Mitt.

1. **T. instratum** (Brid.) Broth.
(3543 *Merrill*) October. On trees in forests. Malaya to New Guinea.

3. **ECTROPOTHECIUM** Mitt.

1. **E. meyenianum** (Hamp.) Jaeg.
(3544 *Merrill*) October. On wet bowlders in river bed. Endemic.
2. **E. cyperoides** (Hook.) Jaeg.
(1408 *Copeland*) August. On recently burned-over ground at 1,000 m. British India to Malaya and the Caroline Islands.

LESKEACEÆ.

1. **THUIDIUM** Schimp.

1. **T. trachypodium** (Mitt.) Br.
(2559 *Merrill*) October. On damp bowlders and tree trunks. British India to Sumatra and Java.

HYPNODENDRACEÆ.

1. **MNIODENDRON** Lindb.

1. **M. fusco-mucronatum** (C. Mull.) Broth.
(281 *Whitford*). On rocks in damp ravines at 940. Endemic.

PTERIDOPHYTA.

FILICALES.[4]

FILICALES LEPTOSPORANGIATÆ.

HYMENOPHYLLACEÆ.

1. **TRICHOMANES** Sm.

1. **T. auriculatum** Blume.
(6744 *Elmer*) November; (397 *Topping*) May. On exposed ridges in the mossy forests above 1,000 m.
2. **T. motleyi** Bosch.
(3523 *Merrill*) October. On wet bowlders in river bed at 120 m.

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[4] This list of vascular cryptogams has been compiled from named specimens in the herbarium, the identifications having been made by Dr. E. B. Copeland, formerly of this office. While in press several additional identifications have been received from Dr. H. Christ, Bâle, Switzerland, these species having been inserted in the proof, the identifications being credited to Dr. Christ in the text.

3. **T. javanicum** Bl.

(263, 513 *Whitford*) May, July; (206, 207 *Copeland*) January; (3121 *Merrill*) October; (2397 *Borden*) January; (2420 *Meyer*) January; (6880 *Elmer*) November; (451 *Topping*) May. In ravines along streams 150 to 600 m.

4. **T. parvulum** Poir.

(177 *Whitford*) May. In ravines 500 to 700 m.

5. **T. pallidum** Blume.

(1106 *Whitford*) February; (455 *Topping*) May; (6799 *Elmer*) November; (205 *Copeland*) January; (3234 *Merrill*) October. On trees and wet cliffs above 1,200 m.

6. **T. maximum** Blume.

(204 *Copeland*) January; (440 *Whitford*) May, July; (435, 446, 448 *Topping*) May; (2421 *Meyer*) January; (1242, 1768 *Borden*) June, August; (6879 *Elmer*) November; (3115 *Merrill*) October. In ravines and on exposed ridges in the mossy forests 100 to 1,200 m.

7. **T. bipunctatum** Poir.

(3123 *Merrill*) October; (175 *Whitford*) May; (6800 *Elmer*) November. On trees and cliffs in forests 100 to 600 m.

8. **T. rigidum** Sw.

(274 *Whitford*) May; (3214 *Merrill*) October. On damp ledges and boulders in forests 400 to 600 m. (det. *Christ*).

2. HYMENOPHYLLUM Linn.

1. **H. multifidum** Sw.

(209 *Copeland*) January; (3231 *Merrill*) October; (7034 *Elmer*) November. On wet cliffs above 1,200 m.

2. **H. smithii** Hook.

(208 *Copeland*) January; (165, 443 *Whitford*) May, July; (454 *Topping*) May; (3233 *Merrill*) October; (6801 *Elmer*) November. On wet mossy cliffs and trees above 1,200 m.

POLYPODIACEÆ.

1. POLYSTICHUM Roth.

1. **P. coniifolium** (Wall.) Presl.; Copeland Govt. Lab. Pub. 28 (1905) 18.

(136, 142 *Barnes*) January; (*Copeland*) January; (433 *Topping*) May; (136 *Whitford*) May. In forests 600 to 800 m. Africa to Polynesia.

2. NEPHRODIUM Rich.

1. **N. canescens** (Blume) Christ; Copeland l. c. 27.

(6970 *Elmer*) November; (3130 *Merrill*) October; (6153 *Leiberg*) July; (250 *Copeland*) January; (381 *Topping*) May. On wet rocks and ledges along the river above 100 m. Java, Celebes.

2. **N. rubidum** Hook.; Copeland l. c. 27.

(272 *Whitford*) May. Along streams in forests 500 to 600 m. Java and Borneo (?).

3. **N. moulmeinense** Beddome; Copeland l. c. 29.

(427 *Topping*) May; (6090 *Leiberg*) July. In forests 100 to 300 m. British India and Malaya.

4. **N. hirsutum** J. Sm.; Copeland l. c. 30.

(1312 *Whitford*) June. In forests at 350 m. Celebes.

5. **N. philippinense** Baker; Copel. l. c. 31.

(224, 225 *Copeland*) January; (108, 371 *Whitford*) April, June. Along streams 75 to 200 m. Endemic.

6. **N. parasiticum** (Linn.) Baker; Copel. l. c. 32.

(226, 1389 *Copeland*) February, August. In forests 250 to 900 m. Tropics generally.

3. ASPIDIUM Swartz.

1. **A. difforme** Blume; Copel. l. c. 35.

(424, 447 *Topping*) May; (6684 *Elmer*) November. Malaya.

2. **A. whitfordi** Copel. l. c. 35.

(201 *Whitford*) May. In forests, river cañon at 550 m. Endemic.

3. **A. cicutarium** (Linn.) Sw.; Copel. l. c. 37.

(1959 *Borden*) October; (217 *Copeland*) February; (533 *Topping*) May. In forests at about 200 m. Tropics generally.

4. **A. irriguum** J. Sm.; Copel. l. c. 38. *A. lamaoense* Copel. l. c. 35.

(223 *Copeland*) February; (2497 *Meyer*) January. On rocks along streams below 120 m. Endemic.

4. POLYBOTRYA H. B. K.

1. **P. apiifolia** Hook.; Copel. l. c. 40.

(6162 *Leiberg*) July; (1758 *Borden*) August; (6659 *Elmer*) November; (506 *Whitford*) July; (*Copeland*) February; (3129 *Merrill*) October; (73 *Barnes*) November. On rocks and banks along streams 75 to 200 m. Endemic.

2. **P. appendiculata** (Willd.) Blume; Copel. l. c. 40.

(292 1099 *Whitford*) May, February; (6705 *Elmer*) November; (254 *Copeland*) January. In ravines 200 to 800 m. Tropical Asia to Malaya.

5. GYMNOPTERIS Bernh.

1. **G. inconstans** Copel. l. c. 43.

(6076 *Leiberg*) July; (6703 *Elmer*) November; (437, 1124 *Whitford*) June, March; (386, 444 *Topping*) May; (251 *Copeland*) January; (3128 *Merrill*) October. On damp rocks in river bed 100 to 650 m. Endemic.

2. **G. contaminans** (Wall.) Bedd.; Copel. l. c. 43.

(249 *Copeland*) February. In forests along the river at 160 m. British India and Burma.

3. **G. taccaefolia** (Hook.) J. Sm.; Copel. l. c. 42.

(537 *Whitford*) July. In thickets below 75 m. Endemic.

6. DIPTERIS Reinw.

1. **D. conjugata** (Kaulf.) Reinw.; Copel. l. c. 44.

(449 *Topping*) May; (6993 *Elmer*) November; (2091 *Borden*) November; (3228 *Merrill*) October; (250 *Whitford*) May. On exposed ridges in the mossy forest above 1,200 m. Malaya to Formosa and Polynesia.

7. NEPHROLEPIS Schott.

1. **N. cordifolia** Presl.; Copel. l. c. 46.

(143 *Whitford*) May; (3236 *Merrill*) October; (438 *Topping*) May; (6824 *Elmer*) November. On exposed ridges in the mossy forest above 1,200 m. Tropics generally.

2. **N. acuta** Presl; Copel. l. c. 47.

(404 *Topping*) May. In the river cañon. Tropics generally.

8. OLEANDRA Cav.

1. **O. colubrina** (Blanco) Copel. l. c. 48.

(1381 *Copeland*) August; (450 *Topping*) May; (6819 *Elmer*) November; (3238 *Merrill*) October; (1587, 2092 *Borden*) August, November; (248 *Whitford*) May. On exposed ridges in the mossy forest above 1,200 m. Endemic.

9. **HUMATA** Cav.

1. **H. cumingii** (Hook.) Copel. l. c. 51.

(349 *Topping*) May; (2413 *Meyer*) January. On trees in the mossy forest above 1,000 m. Endemic.

2. **H. repens** (Linn.) J. Sm.; Copel. l. c. 50.

(347 *Barnes*) February; (128 *Whitford*) May; (3210 *Merrill*) October; (*Copeland*) January; (6969 *Elmer*) November. On rocks and trees in the mossy forest, exposed ridges, above 1,000 m. Tropical Asia to Japan, Malaya and Australia.

10. **DAVALLIA** Smith.

1. **D. solida** Sw., var. **latifolia** Hook.

(220 *Whitford*) May; (6894 *Elmer*) November. With the preceding.

2. **D.** sp.

(3715 *Merrill*) January; (1343 *Borden*) July; (1010 *Whitford*) October. On exposed ridges in the mossy forest above 1,000 m. Malaya and Polynesia.

11. **MICROLEPIA** Presl.

1. **M. ciliata** (Hook.) Copel. l. c. 55.

(375 *Topping*) May. Endemic.

2. **M. pinnata** Cav.; Copel. l. c. 55.

(6831 *Elmer*) November; (170, 1188 *Whitford*) May, March; (367 *Topping*) May; (6072, 6073 *Leiberg*) July; (232 *Copeland*) January; (1344 *Borden*) July. In forests 100 to 1,300 m. Malaya and Polynesia.

3. **M. pinnata** Cav. var. **gracilis** (Blume) Copel. l. c. 55.

(6988 *Elmer*) November; (154 *Whitford*) May; (354 *Topping*) May; (3213 *Merrill*) October; (1379 *Copeland*) August. With the preceding at higher altitudes.

4. **M. speluncae** (L.) Moore; Copel. l. c. 56.

(*Whitford*) December. In forests at about 100 m. Tropics generally.

12. **DENNSTAEDTIA** Bernh.

1. **D. cuneata** (Hook.) Christ; Copel. l. c. 57.

(195, 1115 *Whitford*) May, February; (399 *Topping*) May. In ravines 600 to 800 m. Batjan.

2. **D. smithii** (Hook.) Christ; Copel. l. c.

(1133 *Whitford*) March. In ravines, 700 to 1,100 m. Formosa and Java.

13. **LINDSAYA** Dryand.

1. **L. davallioides** Blume; Copel. l. c. 64.

(1380 *Copeland*) August. Mossy forest on exposed ridges at 1,100 m. Malaya.

2. **L. concinna** J. Sm.; Copel. l. c. 61.

(2396 *Borden*) January; (3779 *Merrill*) January; (228, 231, 271 *Copeland*) January; (235, 1109 *Whitford*) May, February; (6161, 6071 *Leiberg*) July; (395, 425, 432 *Topping*) May; (2419 *Meyer*) January, (6685 *Elmer*) November. In forests 100 to 900 m. Borneo.

3. **L. hymenophylloides** Blume; Copel. l. c. 60.

(158, 1107 *Whitford*) May, February; (3220 *Merrill*) October; (229 *Copeland*) January; (393 *Topping*) May. On exposed ridges in the mossy forest above 1,100 m. Java and New Caledonia.

4. **L. merrilli** Copel. l. c. 61.

(280 *Whitford*) May. Ravines, river cañon at 1,050 m. Endemic.

5. **L. orbiculata** (Lam.) Mett. *L. montana* Copel. l. c. 62.

(230, 1385 *Copeland*) January, August; (351 *Topping*) May; 1162 *Whitford*) March. In forests above 1,000 m.

14. HEMIONITIS Linn.

1. **H. arifolia** (Burm.) Bedd.; Copel. l. c. 67.

(532 *Whitford*) July; (6113 *Leiberg*) July; (3259 *Merrill*) October. In thickets on earth banks below 100 m. India.

2. **H. gymnopteroidea** Copel. l. c. 67.

(1398 *Copeland*) August; (6164 *Leiberg*) July; (6660 *Elmer*) November; (498 *Whitford*) July; (166 *Barnes*) January; (3113 *Merrill*) October; (2124 *Borden*) November. In thickets and forests below 150 m. Endemic.

15. LOXOGRAMME Presl.

1. **L. lanceolata** (Blume) Presl.; Copel. l. c. 68.

(1406 *Copeland*) August; (186, 1125 *Whitford*) May, March; (389, 415, 429 *Topping*) May; (6972 *Elmer*) November. On mossy rocks in river cañon and on ridges in the mossy forest above 600 m. Africa to Japan and Polynesia.

16. CALLIPTERIS Bory.

1. **C. esculenta** (Retz.) Copel. l. c. 71.

(2542, 2552 *Merrill*) June; (6682 *Elmer*) November. On banks of, and on bars in the bed of the Lamao River. Tropical Asia to Formosa and Malaya. T. *Paco.*

17. DIPLAZIUM Sw.

1. **D. polypodioides** Blume; Copel. l. c. 76.

(132 *Barnes*) January; (1238 *Borden*) June; (194 *Whitford*) May; (365, 398 *Topping*) May; (6709 *Elmer*) November; (235 *Copeland*) February. In forests 100 to 800 m. British India and Malaya.

2. **D. sylvaticum** Sw.; Copeland l. c. 73.

(238, 1383 *Copeland*) January, August; (1328 *Borden*) July; (531 *Topping*) May; (6010 *Leiberg*) July; (234 *Whitford*) May. In forests 100 to 700 m. Tropics generally.

18. ASPLENIUM Linn.

1. **A. nidus** Linn.; Copel. l. c. 78.

(6054 *Leiberg*) July; (6798 *Elmer*) November; (401 *Topping*) May. In forests above 600 m. Mauritius to Japan and New Caledonia.

2. **A. subnormale** Copel. l. c. 80.

(236, 1395 *Copeland*) February, August; (445 *Topping*) May; (6154 *Leiberg*) July. In forests at about 100 m. Endemic.

3. **A. tenerum** Forst.; Copel. l. c. 81.

(316 *Whitford*) May; (383 *Topping*) May; (*Copeland*) January. In mossy forests on exposed ridges above 900 m. Tropical Asia to Malaya and Polynesia.

4. **A. macrophyllum** Sw.; Copel. l. c. 83.

(275 *Whitford*) May; (422 *Topping*) May. In river cañon above 500 m. Tropical Asia to Malaya and Polynesia.

5. **A. hirtum** Kaulf.; Copl. l. c. 83.

(385, 412, 428 *Topping*) May; (3212, 3760 *Merrill*) October, January; (6792, 6971 *Elmer*) November; (218, 315 *Whitford*) May; (143 *Barnes*) January; (1345 *Borden*) July. On exposed ridges in the mossy forest above 900 m. Madagascar to Polynesia.

6. **A. laserpitiifolium** Lam.; Copel. l. c. 85.
(371, 382, 384, 414 *Topping*) May; (6712, 6794 *Elmer*) November; (153 *Barnes*) January; (237 *Copeland*) February; (176 *Whitford*) May. On exposed ridges and in ravines above 700 m. Tropical Asia to Malaya and Polynesia.

19. STENOCHLAENA J. Sm.

1. **S. sorbifolia** (Linn.) J. Sm.; Copel. l. c. 88.
(368 *Barnes*) March; (423, 431 *Topping*) May. In forests above 100 m. Tropics generally.

20. BLECHNUM Linn.

1. **B. orientale** Linn.; Copel. l. c. 89.
(1331 *Whitford*) May; (*Copeland*). Eroding river bank at 400 m., and on ridges at 1,200 m. Tropical Asia to Australia and Polynesia.

21. ADIANTUM Linn.

1. **A. alatum** Copel. l. c. 93.
(243, 1399 *Copeland*) January, August; (2576 *Meyer*) February. In thickets and forests 30 to 200 m. Endemic.
2. **A. caudatum** Linn.; Copel. l. c. 93.
(164 *Barnes*) January; (200 *Whitford*) May; (392 *Topping*) May. In thickets and forests 50 to 550 m. Tropical Africa, Asia, and Malaya.
3. **A. diaphanum** Blume; Copel. l. c.
(6986 *Elmer*) November; (1098 *Whitford*); (378, 380 *Topping*) May. On shaded banks in ravines and on exposed ridges above 600 m. China to Malaya and New Zealand.
4. **A. hispidulum** Sw.; Copel. l. c. 94.
(1163 *Whitford*) March; (6974 *Elmer*) November; (355 *Topping*) May; (3256 *Merrill*) October; (1390 *Copeland*) August. On slopes and on exposed ridges in the mossy forest above 1,000 m. Paleotropic.
5. **A. philippense** Linn.; Copel. l. c. 94. *A. lunulatum* Burm.
(6748 *Elmer*) November; (1397 *Copeland*) August. In thickets and forests below 200 m. Tropics generally.

22. HYPOLEPIS Bernh.

1. **H. tenuifolia** Bernh.; Copel. l. c. 95.
(233 *Copeland*) February; (420 *Topping*) May; (466 *Whitford*) July. In cañons and on ridges 100 to 1,200 m. Malaya to New Zealand.

23. CHEILANTHES Sw.

1. **C. farinosa** (Forsk.) Kaulf.; Copel. l. c. 96.
(3192 *Merrill*) October; (1394 *Copeland*) August. On exposed ridges in the mossy forest above 1,000 m., dwarfed forms. Tropics generally.
2. **C. tenuifolia** (Burm.) Sw.; Copel. l. c.
(3143 *Merrill*) October; (6110 *Leiberg*) July. In thickets below 100 m. Tropical Asia to Malaya, New Zealand and Polynesia.

24. PTERIS Linn.

1. **P. cretica** Linn.; Copel. l. c. 100.
(6155 *Leiberg*) July; (3122 *Merrill*) October. On wet banks and ledges at about 100 m. Tropics generally.
2. **P. semipinnata** Linn.; Copel. l. c. 101.
(3790 *Merrill*) January. On exposed ridges in the mossy forest above 1,200 m. Tropical Asia to Japan and Borneo.

3. **P. heteromorpha** Fée.; Copel. l. c. 101.

(2072 *Borden*) October; (6150 *Leiberg*) July; (3772 *Merrill*) January; (1037 *Whitford*) December; (2287 *Meyer*) December. In thickets below 100 m. Celebes.

4. **P. quadriaurita** Retz.; Copel. l. c. 101.

(239 *Copeland*) February. In forests at 120 m. Tropics generally.

5. **P. longipes** Don.; Copel. l. c. 102.

(*Copeland*) January. In forests at 100 m. British India to New Guinea.

6. **P. kleiniana** Presl.; Copel. l. c. 103.

(240 *Copeland*) February. In forests 100 to 160 m. British India.

7. **P. excelsa** Gaud.; Copel. l. c. 102.

(409 *Topping*) May; (1132 *Whitford*) March. In river cañon at 1,000 m. Himalayan region to Hawaii.

8. **P. tripartita** Sw.; Copel. l. c. 103.

(242 *Copeland*) February; (1130 *Whitford*) March; (421 *Topping*) May. River cañon up to 1,000 m. Tropical Africa, Asia to Malaya and Polynesia.

9. **P.** sp.

(3755 *Merrill*); (361, 443 *Topping*) May; (241 *Copeland*) February; (216 *Whitford*) May. In forests 120 to 1,200 m.

25. PTERIDIUM Gleditsch.

1. **P. aquilinum** (Linn.) Kuhn.; Copel. l. c. 104.

On ridges in the mossy forest above 1,000 m. (*Copeland*). Cosmopolitan, tropical, and temperate regions, chiefly northern.

26. HISTIOPTERIS Agardh.

1. **H. incisa** (Thumb.) Agardh.; Copel. l. c. 104.

(439 *Topping*) May; (6982 *Elmer*) November. On exposed ridges in the mossy forest above 1,200 m. Tropical Asia, Malaya, etc.

27. VITTARIA Sm.

1. **V. elongata** Sw.; Copel. l. c. 107.

372 *Topping*) May; (1401 *Copeland*) August. In forests at 1,600 m. Tropics of the eastern Hemisphere.

2. **V. lineata** Sw.; Copel. l. c. 107.

(2412 *Meyer*) January; (1818 *Borden*) September; (6797, 6966 *Elmer*) November; (362, 368 *Topping*) May; (217, 444, 497 *Whitford*) May, July; (221, 222 *Copeland*) January, February; (3742, 3132 *Merrill*) January, October. In forests and on exposed ridges 100 to 1,300 m. Tropics generally.

28. ANTROPHYUM Kaulf.

1. **A. reticulatum** Kaulf.; Copel. l. c. 109.

(6654 *Elmer*) November; (2286 *Meyer*) December; (388, 405, 406, 437 *Topping*) May; (196 *Whitford*) May; (210, 211 *Copeland*) February; (1219 *Borden*) June; (2540 *Merrill*) June. In forests 150 to 1,000 m. Tropical Asia to Malaya and Polynesia.

29. HYMENOLEPIS Kaulf.

1. **H. spicata** (Linn. f.) Presl.; Copel. l. c. 110.

(6967 *Elmer*) November; (213, 1402 *Copeland*) January, August. In forests and on exposed ridges above 500 m. Madagascar, tropical Asia, Malaya, and Polynesia.

30. **TAENITIS** Willd.

1. **T. blechnoides** Sw.; Copel. l. c. 111.

(430 *Topping*) May. In forests, a characteristic plant of dry ridges. Ceylon to Malaya.

31. **CHRISTIOPTERIS** Copel.

1. **C. sagitta** (Christ.) Copel. l. c. 111.

(321 *Whitford*) May; (411 *Topping*) May; (1339 *Borden*) July; (7031 *Elmer*) November. On trees, mossy, forest, exposed ridges above 900 m. An endemic, monotypic genus.

32. **NIPHOBOLUS** Kaulf.

1. **N. flossiger** Blume; Copel. l. c. 113.

(312 *Whitford*) May; (7032 *Elmer*) November; (396, 413 *Topping*) May. In forests at 700 m. British India and Java.

2. **N. nummulariæfolius** (Sw.) J. Sm.; Copel. l. c. 114.

(1393 *Copeland*) August; (3757 *Merrill*) January. On exposed ridges in the mossy forest above 1,200 m. British India to Celebes.

3. **N. varius** Kaulf.; Copel. l. c. 114.

(6060 *Leiberg*) July; (6895 *Elmer*) November. In forests at 800 m. Southern China to Java and Polynesia.

33. **POLYPODIUM** Linn.

1. **P. jagorianum** Mett.; Copel. l. c. 118.

(3230 *Merrill*) October; (352 *Topping*) May; (*Copeland*) August. On exposed ridges in the mossy forest above 1,100 m. Endemic.

2. **P. setosum** (Blume) Christ.; Copel. l. c. 119.

(215 *Copeland*) January. With the preceding. Java, Celebes.

3. **P. cucullatum** Nees; Copel. l. c. 120.

(1108 *Whitford*) February; (216 *Copeland*) January. On exposed ridges in the mossy forest above 1,300 m. Ceylon to Samoa.

4. **P. obliquatum** Blume; Copel. l. c. 122.

(*Copeland*) August; (214 *Copeland*) January; (244 *Whitford*) May; (350 *Topping*) May; (6816 *Elmer*) November. On exposed ridges above 900 m. British India and Malaya.

5. **P. subauriculatum** Blume; Copel. l. c. 124.

(318 *Whitford*) May; (1382 *Copeland*) August; (3208 *Merrill*) October; (6053 *Leiberg*) July; (416, 453 *Topping*) May. On exposed ridges in the mossy forest above 1,000 m. Himalayan region to Samoa and New Caledonia.

6. **P. accedens** Blume; Copel. l. c. 124.

(3225, 3750 *Merrill*) October, January; (314 *Whitford*) May; (357 *Topping*) May. On exposed ridges in the mossy forest above 900 m. Malaya and Polynesia.

7. **P. rudimentum** Copel. (?); Copel. l. c. 125.

(3244 *Merrill*) October. On exposed ridges at 1,300 m.

8. **P. punctatum** (Linn.) Christ; Copel. l. c. 126.

(197 *Whitford* May; (402, 417 *Topping*) May; (257 *Copeland*) January. Cañon of the Lamao River above 300 m. Tropical Africa, Asia, Malaya, and Polynesia.

9. **P. myriocarpum** Mett.; Copel. l. c. 126.

(2549 *Merrill*) June; (1325 *Borden*) July; (227 *Copeland*) January; (50 *Whitford*) April; (6704 *Elmer*) November. On bowlders and tree trunks in forests and thickets 75 to 200 m. Cochin China to Malaya.

10. **P. triquetrum** Blume; Copel. l. c. 126.

(6062 *Leiberg*) July; (6973 *Elmer*) November; (1391 *Copeland*) August; (126 *Whitford*) May; (353 *Topping*) May; (2414 *Meyer*) January. On exposed ridges in the mossy forest above 900 m. Malaya and Polynesia.

11. **P. glaucum** Kunze; Copel. l. c. 129.

(410 *Topping*) May; (157 *Whitford*) May; (1392 *Copeland*) August; (1340 *Borden*) July. On exposed ridges in the mossy forest above 900 m. Endemic.

12. **P. nigrescens** Blume; Copel. l. c. 130.

(1404 *Copeland*) August; (379 *Topping*) May. Cañon of the Lamao River above 500 m. British India to Malaya and Polynesia.

13. **P. palmatum** Blume; Copel. l. c. 130.

(3235 *Merrill*) October; (219 *Copeland*) January; (142 *Whitford*) May; (6058 *Leiberg*) July; (358 *Topping*) May; (6968 *Elmer*) November. In forests and on exposed ridges above 800 m. Malaya.

14. **P. albido-squamatum** Blume; Copel. l. c. 131.

(1341 *Borden*) July; (*Copeland*) January, August; (6042 *Leiberg*) July; (1170 *Whitford*) March. On exposed ridges in the mossy forest above 900 m. Malaya.

15. **P. ellipticum** Thunb.; Copel. l. c. 132.

(6655 *Elmer*) November; (373, 418 *Topping*) May; 3116 *Merrill*) October; (220 *Copeland*) February. Cañon of the Lamao River above 150 m. Tropical Asia to Japan and Australia.

16. **P. meyenianum** Schott.; Copel. l. c. 133.

(6064 *Leiberg*) July; (221 *Whitford*) May; (6745 *Elmer*) November; (408 *Topping*) May; (1386 *Copeland*) August; (1499 *Ahern's collector*) July; (1346 *Borden*) July; (3224 *Merrill*) October. On exposed ridges in the mossy forest above 650 m., epiphytic. Endemic.

34. LECANOPTERIS Blume.

1. **L. carnosa** Blume; Copel. l. c. 133.

(403 *Topping*) May; (6043 *Leiberg*) July; (334 *Whitford*) May. On exposed ridges in the mossy forest above 900 m., epiphytic. Malaya.

35. DRYNARIA Bory.

1. **D. quercifolia** (Linn.) Bory.; Copel. l. c. 135.

(372 *Whitford*) June; (7023 *Elmer*) November. In forests at 100 m., epiphytic. Tropical Asia to Malaya and Australia.

36. ELAPHOGLOSSUM Schott.

1. **E. conforme** (Sw.) Schott.; Copel. l. c. 136.

(1384 *Copeland*) August; (3250 *Merrill*) October; (Elmer) November; (442 *Topping*) May. Epiphytic, exposed ridges in the mossy forest above 1,200 m. Tropics generally.

37. ACHROSTICHUM Linn.

1. **A. aureum** Linn.; Copel. l. c. 137.

(358 *Whitford*) July. In salt marsh along the seashore. Tropics generally. T., *Lagolo*.

38. CHEIROPLEURA Presl.

1. **C. bicuspis** Presl.; Copel. l. c. 137.

(*Copeland*) January; (6822 *Elmer*) November; (356 *Topping*) May; (331 *Whitford*) May. On exposed ridges in the mossy forest above 1,000 m. Formosa to Java and New Guinea.

CYATHEACEÆ.

1. **ALSOPHILA** Br.

1. **A. contaminans** Wall.; Christ. Farnkräuter der Erde (1897) 327.
(1134 *Whitford*) March. Cañon of the Lamao River 800 to 1,150 m. Himalayan region to Malaya.

2. **CYATHEA** J. Sm.

1. **C. caudata** (J. Sm.) Copel. *Alsophila caudata* J. Sm.
(6809 *Elmer*) November; (366 *Topping*) May; (3195 *Merrill*) October; (320 *Whitford*) May. In ravines and on exposed ridges 800 to 1,300 m. Endemic.

GLEICHENIACEÆ.

1. **DICRANOPTERIS** Bernh.

1. **D. dolosa** Copel. in Perk. Frag. Fl. Philip. (1905) 193.
(249, 445 *Whitford*) May, July; (440 *Topping*) May; (212 *Copeland*) January; (3237 *Merrill*) October. On exposed ridges in the mossy forest above 1,200 m. Endemic.

2. **D. flagellaris** (Spreng.).
(462 *Whitford*) July. On slopes in forests at 1,250 m. Malay to the Mascarens and Fiji.

SCHIZÆACEÆ.

1. **LYGODIUM** Sm.

1. **L. circinatum** (Burm.) Sw.
(3133 *Merrill*) October; (203 Copeland) February; (491 *Whitford*) July; (532 *Topping*) May; 6002 *Leiberg*) July; (2121 *Borden*) October; (86 *Barnes*) November. In thickets and in forests along the river 75 to 200 m. Southern Asia to Malaya.

2. **L. scandens** Sw.
(3281 *Merrill*) October; (2220 *Meyer*) December; (2025 *Borden*) October. In thickets below 75 m., British India to Malaya and North Australia.

3. **L. japonicum** Sw.
(6120 *Leiberg*) July. In thickets below 50 m. Tropical Asia to Malaya and Australia.

MARATTIALES.

MARATTIACEÆ.

1. **ANGIOPTERIS** Hoffm.

1. **A. crassipes** Wall.
(3794 *Merrill*) January; (270 *Whitford*) May; (6711 *Elmer*) November. River cañon 75 to 600 m. Tropical Asia and Malaya.

2. **MARATTIA** Sm.

1. **M. sambucina** Blume.
(2082 *Borden*) October; (6789 *Elmer*) November; (1116 *Whitford*) March. In ravines and on ridges above 700 m.

OPHIOGLOSSALES.

OPHIOGLOSSACEÆ.

1. OPHIOGLOSSUM Linn.

1. **O. nudicaule** Linn. f.

(3273 *Merrill*) October (det. Christ). In shade of thickets below 100 m. Southern United States to Brazil, Malaya, Japan, and West Africa.

2. **O. pendulum** Linn.

(400 *Topping*) May. In ravines, cañon of the Lamao River above 900 m. Tropical Asia to Polynesia, Eastern Australia and the Mascarene Islands.

3. **O. reticulatum** Linn.

(6100 *Leiberg*) July; (530 *Whitford*) July; (3146 *Merrill*) October. In thickets below 100 m.

2. HELMINTHOSTACHYS Kaulf.

1. **H. zeylanica** (Linn.) Hook.

(531 *Whitford*) July; (6099 *Leiberg*) July. In thickets below 100 m. Tropical Asia to Malaya, Australia, and New Caledonia.

LYCOPODIALES.

LYCOPODIACEÆ.

1. LYCOPODIUM Linn.

1. **L. cernuum** Linn.

(2096 *Borden*) November. Exposed ridges in the mossy forest at 1,250 m., terrestrial.

2. **L. filiforme** Roxb.

(2101 *Borden*) November. Exposed ridges at about 1,250 m., epiphytic.

3. **L. phlegmaria** Linn.

(167 *Whitford*) May; (6828 *Elmer*) November. Exposed ridges in the mossy forest above 1,200 m., epiphytic.

4. **L. squarrosum** Forst.

(325 *Whitford*) May; (376 *Topping*) May; (3959 *Merrill*) March. On exposed ridges above 1,000 m., epiphytic.

5. **L. carinatum** Desv. (?)

(166 *Whitford*) May; (359 *Topping*) May; (3219 *Merrill*) October. On exposed ridges in the mossy forest above 1,200 m., epiphytic.

6. **L.** sp.

(*Merrill*) January. Epiphytic, mossy forest on exposed ridges above 1,200 m.

SELAGINELLACEÆ.

1. SELAGINELLA Linn.

1. **S.** sp.

(3749 *Merrill*) January. On exposed ridges in the mossy forest at 1,200 m.

2. **S.** sp.

(3241 *Merrill*) October; (265 *Copeland*) January; (168 *Whitford*) May; (2382 *Borden*) January; (364, 436 *Topping*) May. On exposed ridges in the mossy forest above 1,000 m.

3. **S.** sp.

(3792 *Merrill*) January; (269 *Copeland*) January; (178, 1299 *Whitford*) May; (6156 *Leiberg*) July; (2174 *Meyer*) December. Along the river and on damp shaded banks in forests 100 to 600 m.

4. **S.** sp.

(3118, 3127, 3782 *Merrill*) October, January; (255 *Whitford*) May. On wet rocks along the Lamao River 100 to 800 m.

5. **S.** sp.

(3775 *Merrill*) January. Shaded places along trails at 100 m.

6. **S.** sp.

(1342 *Borden*) July; (3239 *Merrill*) October; (169, 173 *Whitford*) May; (374, 387 *Topping*) May. In ravines and on ridges above 600 m.

SIPHONOGAMA.

GYMNOSPERMÆ.

CYCADALES.

CYCADACEÆ.

1. CYCAS Linn.

1. **C. circinalis** Linn.; Dyer in Hook. f. Fl. Brit. Ind. **5** (1888) 656.

(3257 *Merrill*) October; (269, 1325 *Whitford*) May; (*Meyer*) February. In forests up to 800 m., widely distributed in the Philippines. Southern Asia to Malaya, New Guinea, and Polynesia. T., *Oliba, Uliba.*

CONIFERÆ.

TAXACEÆ.

1. PODOCARPUS Pers.

1. **P. blumei** Endl.; Pilger in Engler's Pflanzenreich, **18** (1903) 60.

(147, 194 *Barnes*) January; (*Copeland*) January; (1353 *Whitford*) September. In forests at 800 m., Java to Ternate, Celebes and New Guinea.

2. **P. neriifolium** Don; Pilger l. c. 80.

(*Whitford*) March; (2743 *Borden*). In forests at about 500 m. Central Asia to China, Malaya, and New Guinea.

PINACEÆ.

1. AGATHIS Salisb.

1. **A. philippinensis** Warb. Monsunia **1** (1900) 185. *t. 8. f. E.*

(240, 297 *Whitford*) May; (736, 805 *Borden*); (3759 *Merrill*) January, also No. 163 *Merrill*, Decades Philippine Forest Flora, coll. *Borden.* In forests 800 to 1,000 m. Endemic. Sp.-Fil., *Almaciga.*

GNETALES.

GNETACEÆ.

1. GNETUM Linn.

1. **G. gnemon** Linn.; Hook. f. Fl. Brit. Ind. **5** (1887) 641.

(178 *Barnes*) January; (614, 637, 2490 *Borden*) April, January; (2516 *Merrill*) June; (2501 *Meyer*) January; (1036, 1078, 1253 *Whitford*) December, May. In forests 100 to 200 m., widely distributed in the Philippines. Southern Asia to Malaya and New Guinea. T., *Bago.*

2. **G. latifolium** Blume; Beccari, Malesia, **1** (1877) 121.

(1236 *Whitford*) May; (161 *Barnes*) January; (3158 *Merrill*) October; (1805 *Borden*) September. In forests along the river 100 to 300 m., widely distributed in the Philippines. Malaya and New Guinea. T., *Culiat.*

ANGIOSPERMÆ.

MONOCOTYLEDONÆ.

PANDANALES.

PANDANACEÆ.

1. FREYCENETIA Gaudich.

1. **F. ensifolia** Merr. Govt. Lab. Publ. **17** (1904) 5.

(3242 *Merrill*) October; (2624 *Meyer*) February; (1347 *Borden*) July; (329 *Whitford*) May; (6840 *Elmer*) November. On exposed ridges in the mossy forest 800 to 1,200 m. Endemic.

2. **F. luzonensis** Presl.; Warburg in Engler's Pflanzenreich, **3** (1900) 35.

(252 *Copeland*) January; (1311 *Whitford*) June; (3791 *Merrill*) January; (752, 2466 *Borden*) May, January; (2194, 2827 *Meyer*) December, March. In forests along the river, 100 to 800 m. Endemic. T., *Malapandan.*

3. **F.** sp.

(2826 *Meyer*) March. In forests at 900 m., flowering specimen only.

2. PANDANUS Linn.

1. **P. tectorius** Sol.; Warburg l. c. 46.

(92 *Barnes*) November; (7018 *Elmer*) November. Along the seashore, widely distributed in the Philippines. Tropical shores of Asia and Malaya. T., *Pandan.*

2. **P. arayatensis** Merr. Govt. Lab. Publ. **17** (1904) 7. *pl. 3.*

(3125 *Whitford*) May. In forested ravines and on exposed ridges, 900 to 1,200 m. Endemic. T., *Pandan golo.*

3. **P. whitfordii** Merr. l. c. 8.

(351, 507 *Whitford*) May, July; (2944 *Borden*) March. In forests along streams and on ridges 100 to 1,200 m. Endemic.

This species may not be distinct from *Pandanus gracilis* Blanco, although the habit of the specimens cited above is quite different from that of *Pandanus gracilis* as described by Blanco.

4. **P. luzonensis** Merr. l. c. 6.

(3317 *Merrill*); (91 *Barnes*); (6662 *Elmer*). Common in thickets along streams and in forests 15 to 400 m. Endemic. T., *Pandan.*

GLUMIFLORÆ.

GRAMINEÆ.

1. DIMERIA R. Br.

1. **D. orinthopoda** Trin. var. **tenera** (Trin.) Hack. in DC. Monog. Phan. **6** (1889) 81.

(3283, 3286 *Merrill*) October, January. In dry open grass lands and on bluffs near the seashore. Tropical Asia to Japan and Java.

2. IMPERATA Cyr.

1. **I. cylindrica** (Linn.) Beauv., var **koenigii** (Retz.) Benth. *I. arundinacea* Cyr.; Hack. l. c. 94.

(*Merrill*) In open grass lands common and widely distributed in the Philippines. Southern Asia to Japan, Malaya, and Australia.

2. **I. exaltata** Brongn.; Hack. l. c. 98.

(*Whitford*) Gregarious, frequently completely occupying open lands up to 900 m. Malaya to New Hebrides, varieties in tropical America. T., *Cogon.*

3. MISCANTHUS Anderss.

1. **M. japonicus** Anderss.; Hack. l. c. 107.

(3198 *Merrill*) October; (1341 *Whitford*) September. On exposed ridges at 1,200 m. Japan to southern China, Malaya, and Polynesia.

4. SACCHARUM Linn.

1. **S. spontaneum** Linn., subsp. **indicum** Hack. l. c. 114.

(1935 *Borden*) October. In open lands below 100 m., widely distributed in the Philipppines. Southern Asia to Malaya and New Guinea. T., *Talahib.*

5. POGONATHERUM Beauv.

1. **P. saccharoideum** Beauv., var. **monandrum** (Roxb.) Hack. l. c. 193.

(10 *Whitford*); (621 *Borden*); (6696 *Elmer*). Abundant on mossy ledges along streams, widely distributed in the Philippines. Southern Asia to Japan and Malaya.

6. MANISURIS Sw.

1. **M. granularis** Linn. f.; Hack. l. c. 314. *Hackelochloa granularis* O. Kuntze.

(3094 *Merrill*) October. In open grass lands below 100 m. Tropical and subtropical regions of the world.

7. ANDROPOGON Linn.

1. **A. brevifolius** Sw.; Hack. l. c. 383.

(3306 *Merrill*) October; (6785 *Elmer*) November. In open grass lands below 100 m. Tropics of the world.

2. **A. aciculatus** Retz. Hack l. c. 562.

(801 *Borden*); (385 *Whitford*). In open grass lands below 100 m. Tropical Asia to Malaya and Polynesia.

8. ZOYSIA Willd.

1. **Z. pungens** Willd.; Hook. f. Fl. Brit. Ind. **7** (1897) 99.

(1303 *Whitford*). Open places near the seashore. Tropical Asia, to Malaya and Australia.

9. THYSANOLAENA Nees.

1. **T. maxima** (Roxb.) O. Kuntze. *T. agrostis* Nees; Hook. f. l. c. 61.

(1126 *Whitford*) October. Open grass lands and thickets. Tropics of the world.

10. PASPALUM Linn.

1. **P. scrobiculatum** Linn.; Hook. f. l. c. 10.

(3268 *Merrill*). In open grass lands, widely distributed in the Philippines. Tropics of the world.

11. ISACHNE R. Br.

1. **I. beneckei** Hack. Oesterr. Bot. Zeitschr. **51** (1901) 459.
(3201 *Merrill*); (464 *Whitford*). On exposed ridges at 1,200 m. Java.
2. **I. monticola** Büse in Miq. Pl. Jungh. (1855) 379.
(3245 *Merrill*); (264 *Whitford*). With the preceding. Formosa to Java.
3. **I. minutula** Kunth. Rev. Gram. **2:** *t. 117*.
(*Whitford*) September, wet lands near the seashore. Malaya and Polynesia.

12. PANICUM Linn.

1. **P. caudiglume** Hack. Oesterr. Bot. Zeitschr. **51** (1901) 428.
(3307 *Merrill*). Borders of dry thickets below 100 m. Java.
2. **P. flavidum** Retz.; Hook. f. Fl. Brit. Ind. **7** (1897) 28.
(6145 *Leiberg*). In open grass lands below 100 m., common throughout the Philippines. Tropical Asia, Africa, and Malaya.
3. **P. indicum** Linn.; Hook. f. l. c. 41.
(3109 *Merrill.*) In open grass lands below 100 m., common. Tropical Asia to Malaya and Australia.
4. **P. montanum** Roxb.; Hook. f. l. c. 53.
(6735 *Elmer*) November. Widely distributed in the Philippines. Tropical Asia and Malaya.
5. **P. ouonbiense** Balansa, Journ. de Bot. **4** (1890) 142.
(533 *Whitford*). Open grass lands at 75 m., common and widely distributed in the Philippines. Cochin China.
6. **P. parvulum** Trin. Mem. Acad. Petersb. VI. **3** (1835) 205.
(3268 *Merrill*). In open grass lands below 100 m. Tropical Asia and Malaya. An apparently distinct form or variety of this species is presented by No. 3164 *Merrill,* from the same locality.
7. **P. pilipes** Nees et Arn. ex Büse in Miq. Pl. Jungh. (1855) 376.
(3156 *Merrill*); (1821 *Borden*); (1020 *Whitford*); (6650 *Elmer*). Common along trails in the forests and thickets 50 to 150 m., widely distributed in the Philippines. Tropical Asia to Madagascar, Malaya, Australia, and Polynesia.
8. **P. radicans** Retz. Obs. 4 (1779–91) 18.
(3255 *Merrill*); (6646 *Elmer*). With the preceding. Tropical Asia and Malaya.
9. **P. sarmentosum** Roxb.; Hook. f. l. c. 54.
(1019 *Whitford*). Along trails in open forests. British India to China and Malaya.
10. **P. trypheron** Schult.; Hook. f. l. c. 47.
(3107 *Merrill*); (6024 *Leiberg*). In open lands below 100 m. Tropical Asia and Africa to Malaya.
11. **P. miliare** Lam.; Hook. f. l. c. 46.
(*Whitford*) September. In open damp or wet lands near the sea shore, widely distributed in the Philippines. Tropics generally.
12. **P. myurus** H. B. K.; Hook. f. l. c. 39.
(*Whitford*) September. On open wet lands below 100 m. Tropical Asia, Malaya, Australia, and America.

13. ICHNANTHUS Beauv.

1. **I. pallens** (Sw.) Munro in Benth. Fl. Hongk. (1861) 414. *Panicum pallens* Sw.; *Panicum nitens* Merr. Govt. Lab. Publ. **17** (1904) 8.
(2756, 3221 *Merrill*). On exposed ridges at 1,200 m. Tropics of the world.

14. OPLISMENUS Beauv.

1. **O. burmannii** (R. Br.) Beauv.; Hook. f. l. c. 68.

(6645 *Elmer*); (3290 *Merrill*); (1021 *Whitford*). Along trails in forests and thickets below 200 m., and on bluffs near the seashore, widely distributed in the Philippines. Tropical Asia to China and Malaya.

2. **O. undulatifolius** (Arduin.) Beauv.; Hook. f. l. c. 66.

(2547 *Borden*); (6987 *Elmer*). Forested slopes at about 150 m. Central and southern Europe and the Tropics generally.

3. **O. undulatifolius** var. **imbecillis** (R. Br.) Hack. *Orthopogon imbecillis* R. Br.; *Oplismenus minus* Merr. Govt. Lab. Publ. **17** (1904) 9.

(3203 *Merrill*). On exposed ridges at 1,200 m., mountains of the Philippines to Malaya and Australia.

15. SETARIA Beauv.

1. **S. flava** Kunth, Rev. Gram. **1** (1835) 46.

(1936 *Borden*). Generally distributed in the Philippines and other tropical countries, treated by most authors as a synonym of *Setaria glauca*, but apparently distinct.

16. THUAREA Pers.

1. **T. sarmentosa** Pers.; Hook. f. l. c. 91.

(*Merrill*). Common on the sandy seashore, widely distributed in the Philippines. Tropical Asia to Madagascar, Malaya, Australia, and Polynesia.

17. SPINIFEX Linn.

1. **S. squarrosus** Linn.; Hook. f. l. c. 63.

(*Whitford*). On the sandy seashore, widely distributed in the Philippines. Tropical shores of Asia and Malaya.

18. ORYZA Linn.

1. **O. sativa** Linn.; Hook. f. l. c. 92.

Somewhat cultivated near Lamao, generally cultivated in tropical and subtropical regions. Rice.

19. LEERSIA Sw.

1. **L. hexandra** Sw.; Hook. f. l. c. 94.

(*Whitford*). In low wet lands below 100 m. widely distributed in the Philippines. Tropics generally.

20. GARNOTIA Brongn.

1. **G. stricta** Brongn.; Hook. f. l. c. 243.

(6989 *Elmer*); (1146 *Whitford*). On exposed ridges at 1,200 m. British India to the Sandwich Islands.

21. CYNODON Pers.

1. **C. dactylon** (Linn.) Pers.; Hook. f. l. c. 288.

(*Merrill*). In open grass lands and waste places below 100 m., widely distributed in the Philippines. Tropical and subtropical regions generally.

2. **C. arcuatus** Presl. Rel. Haenk. **1** (1830) 290; Merrill, Govt. Lab. Publ. **17** (1904) 9.

(3171 *Merrill*). In open grass lands. Endemic.

22. **ELEUSINE** Gaertn.

1. **E. indica** (Linn.) Gaertn. Hook. f. l. c. 293.

(800 *Borden*). In open lands below 100 m., widely distributed in the Philippines. Tropics and subtemperate regions generally.

23. **PHRAGMITES** Trin.

1. **P. karka** (Retz.) Trin.; Hook. f. l. c. 304.

(3178 *Merrill*); (6851 *Elmer*). In thickets along the river below 50 m. Tropical Asia to Africa, Malaya, and Australia.

24. **CENTOTHECA** Desv.

1. **C. lappacea** (Linn.) Desv.; Hook. f. l. c. 332.

(3264 *Merrill*); (1018 *Whitford*); (6649 *Elmer*). Along trails in open forests, widely distributed in the Philippines. Tropical Asia to Africa, Malaya, and Polynesia.

25. **BAMBUSA** Schreb.

1. **B. blumeana** Schult. f.; Hook. f. l. c. 394. *Bambus arundo* Blanco.

The common bamboo cultivated throughout the Philippines and very doubtfully wild in the Archipelago. The base of the culms with numerous stiff spiny branches. Malaya. T., *Cauayan, Cauayan totoo.*

In addition to the above species which is cultivated only, there are no less than four other distinct arborescent species of *Bambuseæ* more or less abundant in the Lamao region, which from lack of flowering or fruiting specimens it is impossible accurately to identify at this time. These species are as follows:

2. **Bambusa monogyna** Blanco, Fl. Filip. ed. 2 (1845) 187.

Similar to *Bambusa blumeana* in size and habit, but the culms naked at the base—that is, not protected with spiny branches. T., *Cauayan quiling.*

3. **Bambusa lima** Blanco, l. c. 189.

A characteristic spineless species, the internodes often reaching a length of 4 feet or slightly more. T., *Anos.*

4. **Bambusa lumampao** Blanco, l. c. 189.

The most abundant species in the region, frequently gregarious and forming almost pure stands under scattered large trees such as *Parkia, Albizzia, Anisoptera* etc., sea level to 300 m., spineless. Sp.-Fil., *Caña boho.*

5. **Bambusa** sp.

Similar to the preceding species but differing in sheath and other characters, not common. T., *Tagisi.*

26. **DINOCHLOA** Büse.

1. **D. diffusa** (Blanco) Merr. Govt. Lab. Publ. **27** (1905) 93.

(75, 519 *Whitford*); (1261 *Borden*); (6092 *Leiberg*); (2550, 3297 *Merrill*) Scandent, abundant in thickets 25 to 150 m. Endemic. T., *Bical.*

2. **D. tjankorreh** Büse; Hook. f. l. c. 414.

(2102 *Borden*). On exposed ridges in forests 900 to 1,200 m. Malaya. T., *Timac.*

CYPERACEÆ.[5]

1. **HYPOLYTRUM** Rich.

1. **H. compactum** Nees et Mey. Linnaea **9** (1834) 288.

(6011 *Leiberg*) July; (782, 2920 *Borden*) May, March; (2496 *Merrill*) June; (51 *Whitford*) April. In forests 150 to 300 m. Endemic.

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[5] This list of *Cyperaceae* is based on identifications made by C. B. Clarke esq., Kew, England.

The specimens collected by Whitford and Borden apparently represent the young form, although indicated by Mr. Clarke as a distinct unpublished species.

2. **H. latifolium** L. C. Rich.; Clarke in Hook. f. Fl. Brit. Ind. **6** (1894) 578.

(2089 *Borden*) November. Exposed ridges in the mossy forest at 1,150 m. Tropical Asia to Malaya, Australia, and Polynesia.

2. CYPERUS Linn.

1. **C. bancanus** Miq. Fl. Ind. Bat. Suppl. 599. (?).

(2581 *Meyer*) February; (291 *Copeland*) January. In forests at about 200 m.

2. **C. diffusus** Vahl.; Clarke l. c. 603.

(463, 465 *Topping*); (6674 *Elmer*) November; (1921 *Borden*) September. Forests 100 to 300 m. Tropics generally.

3. **C. malaccensis** Lam.; Clarke l. c. 608.

(*Whitford*) September. Brackish marshes along the seashore. Tropical Asia to Malaya, Australia, and Polynesia. T., *Balongot.*

4. **C. pilosus** Vahl.; Clarke l. c. 609.

(*Whitford*) September. In open wet lands. Tropical Asia, Africa, Malaya, and Polynesia.

5. **C.** sp.

(*Whitford*) September. In open wet lands.

3. MARISCUS Vahl.

1. **M. albescens** Gaud.; Clarke l. c. 623.

(1305 *Whitford*) June. Brackish swamps near the seashore, widely distributed in the Phiipppines. Tropical Asia, Africa, Malaya, Australia, and Polynesia.

2. **M. cyperinus** Vahl.; Clarke l. c. 621.

(6675 *Elmer*) November; (456, 464 *Topping*); (485 in part, *Whitford*) June, July. In thickets and open lands below 100 m. Tropical Asia to Malaya and Polynesia.

3. **M. microcephalus** Presl.; Clarke l. c. 624.

(*Whitford*) September. In wet lands below 100 m. Tropical Asia to Mauritius and Malaya.

4. **M. philippensis** Steud. Syn. Pl. Cyp. 66.

(3277 *Merrill*) October. On bluffs along the seashore. Endemic.

5. **M. flabelliformis** H. B. K. Nov. Gen. et. Sp. Pl. **1**: 215.

(405 *Whitford*) June. In open lands below 100 m. Tropics generally.

4. KYLLINGIA Rottb.

1. **K. monocephala** Rottb.; Clarke l. c. 588.

(457 *Topping*); (6026 *Leiberg*) July; (*Whitford*) April; (3160 *Merrill*) October. In thickets and open places below 100 m. Tropical and warm regions of the old world.

5. FIMBRISTYLIS Vahl.

1. **F. diphylla** Vahl.; Clarke l. c. 636.

(6135 *Leiberg*) July. In forests at 250 m. Tropics generally.

2. **F. ferruginea** (Linn.) Vahl.; Clarke l. c. 638.

(1304 *Whitford*) June. Tidal meadows. Tropics generally.

3. **F. miliacea** Vahl.; Clarke l. c. 644.

(459 *Topping*). In open wet lands, widely distributed in the Philippines. Tropical and subtropical regions generally.

6. BULBOSTYLIS Kunth.

1. **B. barbata** Kunth; Clarke l. c. 651.

(410 *Whitford*) June. In open, usually damp places below 100 m., widely distributed in the Philippines. All warm regions.

7. SCLERIA Berg.

1. **S. chinensis** Kunth; Clarke l. c. 690.

(3958, 3964 *Merrill*) March. On exposed ridges in the mossy forest, 800 to 1,000 m. China to Singapore, Malaya, and Australia.

2. **S. lithosperma** Sw.; Clarke l. c. 685.

(6144 *Leiberg*) July; (3176 *Merrill*) October. In thickets and forests 50 to 250 m. Tropics generally except Africa.

3. **S. scrobiculata** Nees et Mey. in Wight. Contrib. 117.

(458 *Topping*); (34 *Whitford*) April; (6677 *Elmer*) November; (1929 *Borden*) October. In thickets along the river below 100 m. China and Malaya.

8. CAREX Linn.

1. **C. rhynchachaenium** C. B. Clarke, Govt. Lab. Publ. **35** (1905) 5.

(6983 *Elmer*) November. On exposed ridges in the mossy forest at 1,100 m. Endemic.

2. **C. brunnea** Thunb. Fl. Jap. 38.

(1346 *Whitford*) September; (3196, 3880 *Merrill*) October, August. On exposed ridges in the mossy forest 100 to 1,250 m. Japan to Malaya.

3. **C. continua** C. B. Clarke, l. c. 717.

(189, 1121, 1145 *Whitford*) May, March; (3197 *Merrill*) October; (6985 *Elmer*) November. With the preceding. Asia.

PRINCIPES.

PALMÆ.[6]

1. CALAMUS Linn.

1. **C. mollis** Blanco, var. **major** Becc. Webbia (1905) 345.

(80 *Whitford*) April. In forests above 100 m. Endemic.

2. **C. ornatus** Blume, var. **philippinensis** Becc. l. c. 346.

(212 *Barnes*) January; (343, 502 *Whitford*). In forests above 100 m. Endemic. T., *Limoran.*

3. **C. spinifolius** Becc. l. c. 348.

(1454 *Ahern's collector*) July, 1904, endemic. T., *Yantoc.* The Tagalog name "yantoc" is used in generic sense for all or nearly all species of *Calamus* and *Daemonorops.*

4. **C. siphonspathus** Mart., var. **sublevis** Becc. l. c. 352.

(*Merrill*) January. On exposed ridges above 900 m. Endemic.

2. DAEMONOROPS Blume.

1. **D. gaudichaudii** Mart.; Becc. l. c. 355.

(289 *Whitford*). In forests above 1,000 m. Endemic.

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[6] (Based on Beccari, Le Palme della Isole Filippine, *Webbia* (1905) 315–359. The list is incomplete in *Calamus*, additional material having recently been sent Dr. Beccari for identification.)

3. **ORANIA** Zipp.

1. **O. palindan** (Blanco) Merr. Govt. Lab. Publ. **27** (1905) 88. *Orania philippinensis* Scheff.

(1610 *Borden*) August; (2183 *Meyer*) December. In forests 75 to 400 m. Endemic. T., *Palindan, Barangoi.*

4. **PINANGA** Blume.

1. **P. barnesii** Becc. l. c. 320.

(122 *Barnes*) January; (2762 *Meyer*) February. In forests on exposed ridges above 800 m. Endemic. T., *Bunga macsin.*

2. **P. elmerii** Becc. l. c. 322.

(3846 *Merrill*) August; (1578 *Borden*); (130 *Whitford*). With the preceding species. Endemic.

3. **P. philippinensis** Becc. l. c. 324.

(3316 *Merrill*); (333 *Whitford*). With the preceding species. Endemic.

5. **ARECA** Linn.

1. **A. catechu** Linn.; Becc. l. c. 358.

(*Merrill*). In deserted clearings below 100 m., generally cultivated throughout the Philippines, tropical Asia, and Malaya. T., *Bunga.* The betelnut palm.

6. **NIPA** Thunb.

1. **Nipa fruticans** Wurmb.; Beccari & Hook. f. Fl. Brit. Ind. **6** (1892) 424.

(*Merrill*). Brackish tidal swamp about the mouth of the Lamao River, generally distributed along the mouths of tidal streams throughout the Philippines, and in some localities, notably about the head of Manila Bay, extensively cultivated for the sap secured from the flower stalks, which is utilized in the manufacture of alcohol. Tropical Asia and Malaya. Sp.-Fil., *Nipa;* T., *Sasá.*

SPATHIFLORÆ.

ARACEÆ.

1. **POTHOS** Linn.

1. **P. philippinensis** Engl. Pflanzenreich **21** (1905) 315.

(369 *Barnes*) March, flower; (369, 1046 bis *Whitford*) May, and January, fruit and flower. Scandent on tree trunks, altitude 100 to 700 m. Endemic.

2. **POTHOIDIUM** Schott.

1. **P. lobbianum** Schott.; Engler, l. c. 46.

(503 *Whitford*) July; (3053 *Borden*) May. Common in forests above an altitude of 100 m. Celebes, Moluccas, Ternate.

3. **RHAPHIDOPHORA** Hassk.

1. **R. perkinsæ** Engl. Bot. Jahrb. **37** (1905) 115.

(1169 *Whitford*) March. Scandent, at an altitude of 1,100 m. Endemic.

2. **R. merrillii** Engl. l. c.

(2568 *Borden*) February. Sterile specimens. Endemic.

3. **R.** sp.

(*Whitford*) April.

4. **AMORPHOPHALLUS** Blume.

1. **A. campanulatus** Blume; Engler in DC. Monog. Phan. **1** (1879) 311. *Arum decurrens* Blanco; *Amorphophallus decurrens* Kunth.

(1292, 1337 *Whitford*) May. Common in the bamboo thickets from the seashore to an altitude of about 50 m., widely distributed in the Philippines. Tropical Asia to Madagascar, Malaya to New Guinea and the Fiji Islands. T., *Puñgapuñg.*

2. **A.** sp. (§ *Brachyspatha.*)

(1338 *Whitford*) May. With the preceding, flowers only. The Tagalog name is the same as for the preceding species.

5. **SCHIZMATOGLOTTIS** Zoll. et Mor.

1. **S. rupestris** Zoll. et Mor.; Engler in DC. Monog. Phan. **1** (1879) 350.

(529, 1296 *Whitford*) July, May. Common along shaded banks of ravines and streams at an altitude of 100 m. Java.

6. **AGLAONEMA** Schott.

1. **A. marantifolium** Blume; Engler in DC. Monog. Phan. **1** (1879) 441.

(3889 *Merrill*) August; (6759 *Elmer*) November; (2586 *Meyer*) February; (6111 *Leiberg*) July; (*Copeland*) January. Common in forests and thickets 75 to 200 m. Malayan Archipelago.

7. **ALOCASIA** Schott.

1. **A. macrorrhiza** Schott; Engler; in DC. Monog. Phan. **1** (1879) 503.

(1278 *Whitford*) May. Common in wet open places near the seashore. British India and Malaya. T., *Biga.*

2. **A. warburgii** Engl. Jahrb. **25** (1898) 25.

(516 *Whitford*) July. Common on forested slopes at an altitude of about 75 m. Endemic.

8. **ARISAEMA** Martius.

1. **A. polyphylla** (Blanco) Merr. Govt. Lab. Publ. **27** (1905) 90. *Arisaema cumingii* Schott.

(1350 *Whitford*) September. On exposed ridges in the mossy forest, terrestrial and on very mossy trunks at 1,000 m. Endemic.

FARINOSÆ.

FLAGELLARIACEÆ.

1. **FLAGELLARIA** Linn.

1. **F. indica** Linn.; Hook. f. Fl. Brit. Ind. **6** (1892) 391.

(2500 *Meyer*) January; (2359 *Borden*) January; (1428 *Ahern's collector*) July. Scandent, common in thickets below 100 m. Widely distributed in the Philippines. Tropical Asia, Africa and Malaya. T., *Balinguay.*

BROMELIACEÆ.

1. **ANANAS** Adans.

1. **A. sativus** Lindl. The pineapple, commonly cultivated. Widely distributed in the Philippines, introduced from Mexico. Sp.-Fil., *Piña.*

COMMELINACEÆ.

1. POLLIA Thunb.

1. **P. sorzogonensis** (Mey.) Endl.; Clarke in DC. Monog. Phan. **3** (1881) 126; Hook. f. Fl. Brit. Ind. **6** (1892) 367.

(385 *Whitford*) May. Common on shaded banks, cañon of the Lamao River, altitude 800 m. Widely distributed in the Philippines. Himalayan region to southern China, Malaya, and New Caledonia.

2. COMMELINA Linn.

1. **C. nudiflora** Linn.; Clarke l. c. 144; Hook. f. l. c. 369.

(408 *Whitford*) June; (2270 *Meyer*) December. Common in grass lands, widely distributed in the Philippines. Tropical and subtropical regions of the world.

3. ANEILEMA R. Br.

1. **A. nudiflorum** (Linn.) R. Br.; Clarke l. c. 210; Hook. f. l. c. 378.

(3088 *Merrill*) October. Common in open grass lands, widely distributed in the Philippines. British India to China and Malaya.

4. CYANOTIS Don.

1. **C. cristata** (Linn.) R. et S.; Clarke l. c. 247; Hook. f. l. c. 385

(3103 *Merrill*) October; (1819 *Borden*) September. Common in open grass lands, widely distributed in the Philippines. Tropical Asia and Africa, Malaya.

2. **C. axillaris** (Linn.) R. et S.; Clarke l. c. 244; Hook. f. l. c. 388.

(3102 *Merrill*) October; (2269 *Meyer*) December. In open grass lands, rather common. Widely distributed in the Philippines. British India to Australia.

3. **C. uniflora** Hassk.; Clarke l. c. 242.

(1903 *Borden*) October. In open thickets at 130 m. Malaya.

5. FLOSCOPA Lour.

1. **F. scandens** Lour.; Clarke l. c. 265; Hook. f. l. c. 390.

(1961 *Borden*) September; (296 *Copeland*) February.

In open damp places near streams. Widely distributed in the Philippines. Tropical Asia to Australia.

PONTEDERIACEÆ.

MONOCHORIA Presl.

1. **M. vaginalis** (Linn.) Presl; Hook. f. Fl. Brit. Ind. **6** (1892) 363; Solms Laub. in DC. Monog. Phan. 4 (1883) 524.

(2271 *Meyer*) December. In shallow stagnant water and muddy places. Widely distributed in the Philippines. Tropical Asia and Africa. T., *Biga-bigan.*

LILIIFLORÆ.

LILIACEÆ.

1. DIANELLA Lam.

1. **D.** sp.

(226 *Whitford*) Pseudoepiphytic at 1,000 m. Material very imperfect but quite distinct from *Dianella ensifolia* Red.

2. **DRACAENA** Vandelli.

1. **D. angustifolia** (Rump.) Roxb.; Hook. f. Fl. Brit. Ind. **6** (1892) 327.

(2512 *Merrill*) June; (2930, 3041 *Borden*) March, May; (275 *Copeland*) January; (3017 *Meyer*) May. In forests near the river 100 to 300 m. Widely distributed in the Philippines. British India to Australia.

3. **OPHIOPOGON** Ker.

1. **O. japonicus** (L.) Ker.

(3950 *Merrill*). On exposed ridges at 900 m. Japan to China and Formosa.

4. **SMILAX** Tourn.

1. **S. bracteata** Presl.; A. DC. Monog. Phan. **1** (1878) 197.

(396, 1283 *Whitford*) June, May; (6024 *Leiberg*) July; (6869 *Elmer*) November; (1607 *Borden*) August; (2548 *Merrill*) June. Abundant in thickets below 100 m. Endemic.

2. **S. vicaria** Kunth, Enum **5** (1850) 262. *S. latifolia* Blanco, Fl. Filip. ed. **2** (1845) 548, non R. Br.

(3771 *Merrill*) January. In forests at 800 m. This imperfectly known species is apparently valid, and not at all closely related to *Smilax macrophylla* Roxb., to which Blanco's species was reduced by Naves. The specimen cited above, though imperfect, certainly represents Blanco's species. No. 1877 *Ahern's collector*, Province of Rizal, Luzon, is a much better specimen, while No. 1713 *Merrill* from the same province represents the species in fruit. T., *Sipit olang.*

AMARYLLIDACEÆ.

1. **CRINUM** Linn.

1. **C. asiaticum** Linn.; Hook. f. Fl. Brit. Ind. **6** (1892) 280.

(2011 *Borden*) September. In swampy places along the seashore. Tropical Asia. T., *Bacóng.*

TACCACEÆ.

1. **TACCA** Forst.

1. **T. palmata** Blume; Miq. Fl. Ind. Bat. **3** (1855) 576.

(535 *Whitford*) July; (2560 *Merrill*) June; (6031 *Leiberg*) July. Common in thickets below 100 m. Malaya.

DIOSCOREACEÆ.

1. **DIOSCOREA** Linn.

1. **D. daemona** Roxb.; Hook. f. Fl. Brit. Ind. **6** (1892) 289.

(6014 *Leiberg*) July. In thickets below 100 m. Widely distributed in the Philippines. British India and Malaya. T., *Name.*

2. **D. pentaphylla** Linn.; Hook. f. l. c.

(69 *Barnes*) November. In thickets at 100 m. British India, Malaya, and tropical Africa.

3. **D. divaricata** Blanco Fl. Filip. ed. **1** (1837) 797; ed. **2** (1845) 550.

(2572 *Borden*) February; (3167 *Merrill*) October; (6737 *Elmer*) November. An endemic species, previously known only from Blanco's imperfect description. The very deep fleshy roots are used for food by the Negritos of Mount Mariveles. T., *Buloy, Paquit.*

SCITAMINEÆ.

MUSACEÆ.

1. **MUSA** Linn.

1. **M. paradisiaca** Linn.; Warb. in Engler's Pflanzenreich **1** (1900) 19. The banana. About 9 varieties are commonly cultivated in the river plain region, which can be classified as follows:

Subspecies 1. **normalis** O. Kuntze; Warb. l. c. 20. Pulp edible only when cooked, seedless. *Túndoc,* corresponding to *Musa paradisiaca magna* Blanco; *Matávia* corresponding to *M. paradisiaca maxima* Blanco; *Batúan* corresponding to *M. trogloditarum* Blanco.

Subspecies 2. **sapientium** (Linn.) O. Kuntze; Warb. l. c. Pulp edible without cooking, seedless. *Lacatán,* corresponding to *Musa paradisiaca lacatan* Blanco; *Bun̄gulan,* corresponding to *M. paradisiaca suaveolens* Blanco; *Morádo,* corresponding to *M. paradisiaca violacca* Blanco; *Glória,* corresponding to *M. paradisiaca ternatensis* Blanco; and *Latúndan* corresponding to *M. paradisiaca cinerea* Blanco.

Subspecies 3. **seminifera** (Lour.) Baker; Warb. l. c. 21. Pulp scarcely edible, with numerous seeds. *Sába,* corresponding to *Musa paradisiaca compressa* Blanco.

2. **M.** sp.

A wild banana is sparingly found in the river cañons in the forests at an altitude of from 800 to 900 m., above the sea, sterile specimens only being observed. It probably corresponds to *Musa trogloditarum errans* Blanco "*Saguing machin,*" the "monkey banana," and probably is a wild form of the cultivated banana.

ZINGERBERACEÆ.

1. **CURCUMA** Linn.

1. **C. zeodaria** (Berg.) Roscoe; K. Sch. in Engler's Pflanzenreich, **20** (1904) 110. *Costus nigricans* Blanco, Fl. Filip. ed. **1** (1837) 3; ed. **2** (1845) 3; ed. 3, **1** (1877) 5. *Roscoea* (?) *nigricans* Hassk.; K. Sch. l. c. 425.

(1267 *Whitford*) May; (6142 *Leiberg*) July. Common in the bamboo thickets below 100 m. British India and Malaya.

Blanco's *Costus nigricans* has not previously been satisfactorily identified, but is certainly referable to the above species. The description given by Blanco applies to our specimens while the habitat, time of flowering, and native name is the same. T., *Barac.*

2. **GLOBBA** Linn.

1. **G. merrilli** Ridl. Govt. Lab. Publ. **35** (1905) 83.

(3869 *Merrill*) August; (481 *Whitford*) July; (1598 *Borden*) August; (6158 *Leiberg*) July, 1904. Along streams and on ridges, 300 to 1,000 m. Endemic.

2. **G. campsophylla** K. Sch. in Engler's Pflanzenreich **20** (1904) 145.

(1461 *Ahern's collector*) July. Endemic.

3. **ZINGIBER** Adans.

1. **Z. zerumbet** (Linn.) Smith; K. Sch. l. c. 172.

(6089 *Leiberg*) July; (7028 *Elmer*) November. Common in bamboo thickets below 100 m. British India.

4. **AMOMUM** Linn.

1. **A. elegans** Ridl. Govt. Lab. Publ. **35** (1905) 84.

(207, 300 *Whitford*) May; (3033 *Borden*) May. In shaded ravines 130 to 600 m. Endemic.

5. **ALPINIA** Linn.

1. **A. brevilabris** Presl.; K. Sch. in Engler's Pflanzenreich, **20** (1904) 314.

(58, 239 *Whitford*) April, May; (1202, 2931 *Borden*) June, March; (6853, 6859 *Elmer*) November; (2203 *Meyer*) December. In forests, 130 to 1,100 m. Endemic. T., *Malatalbác.*

2. **A. elegans** (Presl.) K. Sch.; l. c. 352.

(73 *Whitford*) April. In ravines below 100 m. Endemic. T., *Talbác.*

3. **A. philippinensis** Ridl. Govt. Lab. Publ. **35** (1905) 86.

(144 *Barnes*) January; (1203, 1777, 2729, 2477 *Borden*) June to January; (2496 *Meyer*) January; (6130 *Leiberg*) July; (1058 *Whitford*) January. Common in open forests below 250 m. Endemic. T., *Talbác babáyac.*

6. **COSTUS** Linn.

1. **C. speciosus** (Koenig.) Smith, var. **sericea** (Blume) K. Sch. Engler's Pflanzenreich **20** (1904) 399.

(196 *Barnes*) January; (6707 *Elmer*) November; (2171 *Meyer*) December; (2468 *Borden*) January. In forests 100 to 300 m. Widely distributed in the Tropics of the East.

CANNACEÆ.

1. **CANNA** Linn.

1. **C. indica** Linn.; Hook. f. Fl. Brit. Ind. **6** (1892) 260.

(2012 *Borden*) October. In waste places, deserted clearings, etc. Widely distributed in the Philippines. British India and Malaya. T., *Tíquis-tíquis.*

MARANTACEÆ.

1. **DONAX** Lour.

1. **D. arundastrum** Lour.; K. Sch. in Engler's Pflanzanreich, **11** (1902) 33. *Maranta dichotoma* Wall.; *Maranta arundinacea* Blanco.

(729 *Borden*) May; (59 *Whitford*) April; (6083 *Leiberg*) July; (6687 *Elmer*) November; (2584 *Meyer*) February; (261 *Copeland*) January. Very common in thickets and open forests below 100 m., widely distributed in the Philippines. British India to Southern China. T., *Bamban.*

MICROSPERMÆ.

ORCHIDACEÆ.[7]

1. **HABENARIA** Willd.

1. **H. muricata** (Schauer) Vidal; Ames. Orchidaceæ 1 (1905) 64.

(*Merrill*) October. In forests. Endemic.

2. **CORYSANTHES** R. Br.

1. **C. merrilli** Ames l. c. 65, with figure.

(3871 *Merrill*) August. On mossy shaded cliffs, exposed ridges, above 1,100 m. Endemic.

[7] This list of *Orchidaceæ* is very incomplete, and has been compiled from Ames, *Orchidaceæ* 1 (1905) 63–107. Many other species of the more recent collections from the Lamao region are now in the hands of Mr. Ames for identification.

3. **COELOGYNE** Lindl.

1. **C. sparsa** Reichb. f.; Ames l. c. 71.

(140 *Whitford*) May; (254, 273 *Copeland*) January, May. In forests above 100 m. Endemic.

4. **PHOLIDOTA** Lindl.

1. **P. imbricata** Hook.; Ames l. c. 71.

(*Copeland*) January. Abundant on ridges in the mossy forest above 900 m. Tropical Asia and the Andaman Islands.

5. **ACORIDIUM** Nees et Mey.

1. **A. tenellum** Nees et Mey.; Ames l. c. 3. *pl. l. f. 1–19.*

(3209 *Merrill*) October; (742 *Borden*) May; (233 *Whitford*) May. Abundant on trees in the mossy forest, exposed ridges, above 900 m. Endemic.

2. **A. whitfordii** Rolfe in Ames l. c. 73.

(139 *Whitford*) May. Exposed ridges in the mossy forest. Endemic.

6. **PLATYCLINIS** Benth.

1. **P. glumacea** (Lindl.) Hemsl.; Ames l. c. 74.

(3211 *Merrill*) October; (1901 *Borden*) September. On exposed ridges in the mossy forest above 900 m. Endemic.

2. **P. latifolia** (Lindl.) Hemsl.; Ames l. c. 74.

(242 *Whitford*) May. With the preceding. Endemic.

7. **CESTICHIS** Thours.

1. **C. philippinensis** Ames. l. c. 7. *pl. 2.*

(799, 1597 *Borden*) May, August; (3856 *Merrill*) August. On exposed ridges in the mossy forest above 900 m. Endemic.

2. **C. merrilli** Ames, l. c. 11. *pl. 3. f. 13–18.*

(3736 *Merrill*) January; (317 *Whitford*) May. With the preceding. Endemic.

3. **C. compressa** (Blume) Ames l. c. 76, with figure.

(1816 *Borden*) September. With the preceding. Malaya.

8. **OBERONIA** Lindl.

1. **O. iridifolia** (Roxb.) Lindl.; Ames l. c. 77.

(130 *Barnes*) January. Epiphytic on bamboo. Tropical Asia.

9. **CERATOSTYLIS** Blume.

1. **C. philippinensis** Rolfe; Ames l. c. 79, with figure.

(3247 *Merrill*) October. On exposed ridges in the mossy forest above 900 m. Endemic.

10. **CALANTHE** R. Br.

1. **C. furcata** Batem.; Ames l. c. 81.

(3251, 3851 *Merrill*) October, August. In forests. Endemic.

11. **DENDROBIUM** Sw.

1. **D. acuminatum** Rolfe; Ames l. c. 86.

(738 *Borden*) May. Endemic.

2. **D. macraei** Lindl.; Ames l. c. 89.

(225 *Whitford*) May. Tropical Asia and Malaya.

3. **D. uniflorum** Griff.; Ames l. c. 91.
(302 *Whitford*) May. Burma to Malaya.

12. ERIA Lindl.

1. **E. graciliscaposa** Rolfe; Ames l. c. 93.
(307 *Whitford*) May. Endemic.
2. **E. polyura** Lindl.; Ames l. c. 95.
(3733 *Merrill*) January. Endemic.

13. PHREATIA Lindl.

1. **P. luzoniensis** Rolfe; Ames l. c. 96.
(210 *Whitford*) May. Endemic.

14. BULBOPHYLLUM Thouars.

1. **B. bataanensis** Ames l. c. 96.
(121, 163 *Whitford*) May; (796 *Borden*) May. On exposed ridges in the mossy forest. Endemic.
2. **B. cuneatum** Rolfe; Ames l. c. 98.
(3730 *Merrill*). On exposed ridges in the mossy forest. Endemic.
3. **B. dasypetalum** Rolfe; Ames l. c. 98, with figure.
(3720 *Merrill*). On exposed ridges in the mossy forest. Endemic.
4. **B. lasioglossum** Rolfe; Ames l. c. 100.
(138 *Whitford*) May. Endemic.
5. **B. whitfordii** Rolfe; Ames l. c. 100.
(61 *Whitford*) May. Endemic.

15. CYMBIDIUM Sw.

1. **C. aloifolium** (Linn.) Sw.; Ames l. c. 101.
(87 *Whitford*, in part) April. Malaya.

16. PHALAENOPSIS Blume.

1. **P. amabalis** (Linn.) Blume; Ames l. c. 101.
(680 *Borden*) May. Malaya.
2. **P. rosea** Lindl.; Ames l. c. 102.
(*Merrill*) August. In thickets and open forests below 200 m. Endemic.

17. CLEISOSTOMA Blume.

1. **C. ionosmum** Lindl.; Ames l. c. 103.
(737 *Borden*) May. Endemic.

18. AERIDES Lour.

1. **A. quinquevulnera** Lindl.; Ames l. c. 104.
(3888 *Merrill*). In forests at about 100 m. Endemic.

19. RHYNCHOSTYLIS Blume.

1. **R. violacea** (Lindl.) Reichb. f.; Ames l. c. 105.
(46 *Whitford*) April. Endemic.

20. TRICHOGLOTTIS Blume.

1. **T. bataanensis** Ames l. c. 105, with figure.
(679 *Borden*) May. Endemic.

DICOTYLEDONEÆ.

ARCHICHLAMYDEAE (*Choripetalæ and Apetalæ*).

PIPERALES.

PIPERACEÆ.

1. **PIPER** Linn.

1. **P. corylistachyon** (Miq.) C. DC. Prodr. **16** (1869) **1**: 346.

(2526, 3781 *Merrill*) June, January; (6862 *Elmer*) November; (1280 *Whitford*) May. In forests at about 100 m. Endemic.

2. **P. marivelesanum** C. DC. in Perk. Frag. Fl. Philip. (1905) 155.

(3727, 3786 *Merrill*) January; (165 *Barnes*) January; (2507 *Meyer*) January; (1756 *Borden*) August; (1060 *Whitford*) January. In forests 60 to 600 m. Endemic.

3. **P. miniatum** Blume; C. DC. l. c. 354.

(6683 *Elmer*) November; (504, 1040 *Whitford*) July, January; (6077 *Leiberg*) July. In forests and thickets at about 100 m. Malaya.

4. **P. blancoi** Merrill, nom. nov. *P. philippinense* C. DC. l. c. 353, non *P. philippinum* Miq., 1844.

(188 *Whitford*) May. River cañon at 550 m. Endemic.

5. **P.** sp.

(6805 *Elmer*) November; (258 *Copeland*) January; (2097, 2394 *Borden*) November, January; (2411 *Meyer*) January; (209 *Barnes*) January; 3248, 3768 *Merrill*) October, January; (129 *Whitford*) May. On exposed ridges in the mossy forest above 1,000 m.

6. **P.** sp.

(1382 *Merrill*) October; (6855 *Elmer*) November. On exposed ridges at 1,100 m. No. 6890 *Elmer* may be the same.

7. **P.** sp.

(1911 *Borden*) September; (3165 *Merrill*) October; (57 *Barnes*) October. In thickets below 50 m.

2. **PEPEROMIA** Ruiz. et. Pav.

1. **P.** sp.

(114, 313 *Whitford*) May; (6820 *Elmer*) November; (3205, 3721 *Merrill*) October, January. On bowlders and trees, exposed ridges in the mossy forest above 1,000 m.

CHLORANTHACEÆ.

1. **CHLORANTHUS** Swartz.

1. **C. brachystachys** Blume; Hook. f. Fl. Brit. Ind. **5.** (1886) 100.

(6050 *Leiberg*) July; (6640 *Elmer*) November; (103 *Whitford*) April; (2514, 3254 *Merrill*) June, October; (1214 *Borden*) June; (2215 *Meyer*) December. Common in forests, 350 to 500 m. Widely distributed in the Philippines, fruit red. British India to Southern China and Malaya. T., *Cablin*.

2. **C. officinalis** Blume, Hook. f. l. c.

(6885 *Elmer*) November; (6129, 6136 *Leiberg*) July; (1769 *Borden*) August. In forests above 250 m., with the preceding, but the fruit white. Distribution the same as for the preceding species.

MYRICALES.

MYRICACEÆ.

1. **MYRICA** Linn.

1. **M. rubra** (Lour.) Sieb. et Zucc.; Forbes & Hemsl. Journ. Linn. Soc. Bot. **26** (1899) 496.

(2595 *Meyer*) February; (1140, 1174, 1177 *Whitford*) March. In forests and on exposed ridges 650 to 1,200 m. Southern China and Japan to Formosa, British India and Malaya.

This variable species is here first reported from the Philippines, being the third of the genus to be discovered in the Archipelago, the other two being *Myrica vidaliana* Rolfe, from Mayon Volcano, Province of Albay, Luzon, and *Myrica javanica* Blume, which has been found on Mount Apo, Mindanao (1107 *Copeland*) April, 1904.

JUGLANDALES.

JUGLANDACEÆ.

1. **ENGLEHARDTIA** Leschen.

1. **E. spicata** Blume; Hook. f. Fl. Brit. Ind. **5** (1888) 595.

(2478 *Borden*) January; (2311 *Meyer*) December. In forests at about 100 m. British India to Cochin China and Java.

2. **E. subsimplicifolia** Merrill, Govt. Lab. Publ. **35** (1906) 6.

(3942, 3951 *Merrill*) March; (1176 *Whitford*) March; (2759, 2770 *Meyer*) February. In the upper forests, 600 to 950 m. Endemic.

FAGALES.

FAGACEÆ.

1. **QUERCUS** Linn.

1. **Q. bennettii** Miq.; King, Ann. Bot. Gard. Calcutta **2** (1889) 64. *pl.* 58.

(295, 365 *Whitford*) May, June; (632 *Borden*) April; (167 *Merrill*) Decades Philippine Forest Flora, coll. *Borden*, April. In forests 170 to 700 m. Malacca, Borneo, Bangka. T., *Catibang*.

Both of Whitford's specimens were so identified by O. von Seeman while the remaining numbers cited are from the same tree as No. 365 *Whitford*. Identified by the author as *Quercus concentrica* Blanco, which I believe it is.

2. **Q. clementiana** King, l. c. 69. *pl. 63A*.

(1178, 1180 *Whitford*) March. On exposed ridges in the mossy forest at about 1,200 m. Penang.

The above specimens agree well with Philippine material from other localities so identified by von Seeman.

3. **Q. sundaica** Blume; King, l. c. 51. *pl. 47–48*.

(1353 *Borden*) July (det. von Seeman); (1186 *Whitford*) March; possibly also No. 2856 *Meyer*, March. Exposed ridges in the mossy forest above 650 m. Malaya.

4. **Q. wenzigiana** King, l. c. 65. *pl. 58 B*.

(53 *Barnes*) October; (759, 781 *Borden*) May. In forests below 200 m., Malayan Peninsula and Borneo. T., *Catabang*. The above specimens were identified by von Seeman.

5. **Q.** sp. *Q. ovalis* von Seeman in lit., non Blanco.

(806 *Borden*) May; (276 *Whitford*) May; (6897 *Elmer*) November. Forests and ridges at about 650 m.

A species entirely distinct from *Quercus ovalis* Blanco which is represented by No. 3235 *Russell,* Angat, Province of Bulacan, Luzon, June, 1905, from the type locality of Blanco's species, with the same native name and agreeing perfectly with his description.

6. **Q.** spp.

(2997 *Meyer*) May; (6888 Elmer) November; (685 *Borden*); (6052 *Leiberg*) July. On account of incomplete material I have been unable satisfactorily to identify the above specimens, one or two species apparently distinct from those enumerated above being represented.

URTICALES.

ULMACEÆ.

1. CELTIS Linn.

1. **C. philippinensis** Blanco, Fl. Filip. ed. 1 (1837) 197.

(*Whitford*). In thickets below 100 m., widely distributed in the Philippines. Endemic. T., *Malaicmo.*

2. **C.** sp.

(541 *Barnes*) November; (569, 1560, 1631, 1665 *Borden*) August. In forests 100 to 200 m., apparently an undescribed species, but the material very imperfect. T., *Payapa.*

2. TREMA Lour.

1. **T. amboinensis** Blume; Hook. f. Fl. Brit. Ind. **5** (1888) 484.

(1241 *Whitford*) May; (776, 1295 *Borden*) May, July; (2855 *Meyer*) March. Common in thickets below 100 m., widely distributed in the Philippines. British India and Malaya. T., *Dalunot.*

3. APHANANTHE Planch.

1. **A. philippinensis** Planch. Ann. Sc. Nat. III. **10** (1848) 337.

(1286, 1303, 1383, 1397, 1402, 1627, 1628, 1681 *Borden*) July; (417, 1298 *Whitford*) June, May; (6117 *Leiberg*) July; (6691 *Elmer*) November; (2490 Merrill) June. Common in thickets below 100 m. Endemic. T., *Alasiis.*

4. GIRONNIERA Gaud.

1. **G. glabra** Merrill, sp. nov.

A tree about 15 m. high, glabrous or nearly so throughout. Branches slender, glabrous, striate, dark brown, the tips somewhat puberulent. Leaves elliptical lanceolate to oblong lanceolate, alternate, glabrous, subcoriaceous, long acuminate, the base equilateral, acute, entire, 4 to 8 cm. long, 1 to 2.5 cm. wide, shining; nerves about 12 on each side of the midrib, spreading, anastomosing and forming an arched marginal nerve, the secondary veins and reticulations distinct; petioles glabrous or slightly puberulent, slender, 1 to 1.5 cm. long; stipules lanceolate, nearly glabrous, caducous, 5 cm. long or less. Cymes axillary, slightly puberulent, 1 to 2 cm. long, few branched. Pistillate flowers sessile, red. Sepals 4, free, imbricate, ovate to elliptical ovate, acute or obtuse about 2 mm. long, 1.5 mm. wide, the margins slightly ciliate. Ovary ovoid, glabrous, 1-celled with a solitary pendulous ovule; style arms short, 1 to 2 mm. long.

(1205 *Whitford*) March. In forests at about 360 m.

MORACEÆ.

1. ALLAEANTHUS Thwaites.

1. **A. luzonicus** (Blanco) F.-Vill. Nov. App. (1883) 198.

(389, 1290 *Whitford*) June, May; (767, 774, 1281 *Borden*) May, July. In thickets below 100 m. Endemic. T., *Himbabao, Babayan.*

2. MALAISIA Blanco.

1. **M. scandens** (Lour.) K. Sch.; Fl. Deutsch. Schutz. Südsee (1901) 266. *Malaisia tortuosa* Blanco.

(2523 *Merrill*) June. In thickets below 100 m. Southern Asia to Australia.

3. STREBLUS Lour.

1. **S. asper** Lour.; Hook. f. Fl. Brit. Ind. **5** (1888) 489.

(2505 *Meyer*) January; (78 *Whitford*) April; (355 *Barnes*) March; (2491, 2557 *Borden*) January. Abundant in thickets below 100 m. Widely distributed in the Philippines. British India to Southern China and Malaya. T., *Calios.*

4. ARTOCARPUS Forst.

1. **A. communis** Forst. Char. Gen. (1776) 102. *A. incisa* Linn. f. Suppl. (1781) 411.

(1297, 1380, 1531, 1544, 1624, 1682 *Borden*) July, August; (527 *Barnes*) November. Common in the forests and thickets below 200 m. Widely distributed in the Philippines. Malaya and Polynesia. The bread fruit, but all the specimens growing at Lamao the seeded form. T., *Antipolo.*

2. **A. integrifolia** Linn. f.; Hook. f. Fl. Brit. Ind. **5** (1888) 541.

(183 *Barnes*) January. In thickets below 100 m. Widely distributed in the Philippines and cultivated. British India and Malaya. The Jack fruit. T., *Nangca, Lanca.*

3. **A. lanceolata** Tréc.; Miq. Fl. Ind. Bat. **1** (1859) **2:** 288.

(2946 *Borden*) March. In forests at about 140 m. Endemic.

4. **A. rubrovenia** Warb. in Perk. Frag. Fl. Philip. (1905) 166.

(2562, 2915, 2948 *Borden*) February and March. In forests 120 to 250 m. Endemic. T., *Anubiong.* This name is usually applied to *Artocarpus cumingiana* Tréc.

5. **A. xanthocarpa** Merr. Govt. Lab. Publ. **17** (1904) 10.

(367 *Whitford*) June; (682 *Borden*) May; (183 *Merrill*) Decades Philippine Forest Flora. In forests at 200 m. Endemic. T., *Sulipa.*

6. **A. cumingiana** Tréc. l. c.

(*Whitford*). In forests and thickets, widely distributed in the Philippines. Endemic. T., *Anubiong.*

5. FICUS Linn.

§ *Covellia.*

1. **F. barnesii** Merr. Govt. Lab. Publ. **17** (1904) 12.

(325 *Barnes*) February; (6730 *Elmer*) November. In forests at about 200 m. Endemic. T., *Tibig.*

2. **F. minahassæ** Miq.; King. Ann. Bot. Gard. Calcutta **1** (1888) 108. *pl. 140, 141.*

(2845 *Meyer*) March; 2534 *Merrill*) June; (6670 *Elmer*) November; (30 *Whitford*) April; (66 *Barnes*) November; (231 *Merrill*) Decades Philip. Forest Fl., coll. *Barnes,* November. In forests along the river, 20 to 950 m. Celebes. T., *Ayumit.*

3. **F. nota** (Blanco) Merr. Govt. Lab. Publ. **17** (1905) 10.

(2492 *Merrill*) June; (723 *Borden*) May; (324 *Barnes*) February; (173 *Merrill*) Decades Philip. Forest Fl. coll. *Borden*, May; (6689 *Elmer*) November; (2408 *Meyer*) January; (65, 400 *Whitford*) April, June. In forests and thickets usually near the river, 50 to 500 m. Endemic. T., *Tibig.*

4. **F. pseudopalma** Blanco; Merr. l. c. **6** (1904) 9.

(*Whitford*). In thickets below 100 m. rather common and widely distributed in the Philippines. Endemic. T., *Niogniogan.*

5. **F. ribes** Reinw.; King l. c. 110. *pl. 144.*

(2633, 2838 *Meyer*) February, March; (348 *Barnes*) February; (3881 *Elmer*) November. In forests 600 to 900 m. Malaya to New Guinea.

6. **Ficus rubrovenia** Merrill, sp. nov.

A tree 8 to 14 m. high. Branches light brown, striate, glabrous. Leaves oblong to broadly oblong-lanceolate or oblanceolate, coarsely irregularly repand to entire, chartaceous, glabrous, 11 to 20 cm. long, 4 to 7 cm. wide, the apex somewhat abruptly short acuminate, the base acute; nerves prominent beneath, irregular, reddish brown when dry, the primary ones 7 to 8 on each side of the midrib, distant, curved-ascending, anastomosing, the reticulations lax, distinct; petioles 1 to 3 cm. long, glabrous; stipules glabrous, ovate-lanceolate, caducous. Receptacles fasciculate on small branchlets or tubercles from the trunk of the tree, 3 to 10 or more receptacles in a fascicle, the tubercle or branchlet rugose, stout, 2 cm. long or less. Receptacles subglobose to obovoid, glabrous, red when mature, about 1 cm. in diameter, the peduncles slender, glabrous, 1 to 2 cm. long, with 2 or 3 small bracteoles near the apex. Male flowers few, only near the ostiole, their pedicels 1.5 mm. long, monandrous, the anther 0.8 mm. long, the perianth surrounding the anther. Fertile female flowers sessile or pedicelled. Perianth entire, diagonally truncate, about 1 mm. long, slightly enclosing the base of the ovary; ovary ovoid, 1.5 long, the style sublateral, 0.5 mm. long. Gall flowers similar to the fertile female flowers.

(2769, 3003 *Meyer*) February, May; (1183 *Borden*) June; (3138 *Merrill*) October; (6638 *Elmer*) November; (467, 1076 *Whitford*) July, January. In forests 100 to 700 m. A species well characterized by its oblong, irregularly repand to subentire leaves. T., *Tibig.*

§ *Eusyce.*

7. **F. odorata** (Blanco) Merr. l. c. **17** (1904) 15.

(620, 1256 *Borden*) April, June; (168 *Merrill*) Decades Philippine Forest Fl., coll. *Borden*, June; (37 *Whitford*) April; (6652 *Elmer*) November. In thickets and forests below 100 m. Endemic. T., *Pacquiling.*

8. **F. ruficaulis** Merr. l. c. 13.

(512 *Barnes*) February, November; (185 *Merrill*) Decades Philip. Forest Fl., coll. *Borden*, April; (6878 *Elmer*) November; (1233 *Whitford*) April. In forests 100 to 300 m. Endemic.

9. **F. villosa** Blume; King l. c. 137. *pl. 172.*

(2833 *Meyer*) March. In forests at 850 m., not previously reported from the Philippines. Malayan Peninsula and Archipelago.

§ *Neomorphe.*

10. **Ficus paucinervia** Merrill, sp. nov.

A tree reaching a height of about 13 m. Branches brown, striate, minutely pubescent. Leaves alternate, elliptical ovate to oblong ovate, subcoriaceous, 9 to 14 cm. long, 5.5 to 8 cm. wide, narrowed somewhat to the equilateral, rounded, rarely somewhat acute base, the apex abruptly acuminate, the acumen blunt, about 1 cm. long, both surfaces somewhat shining, the upper glabrous, the lower paler, slightly pubescent on the nerves and midrib; nerves about 4 on each side of the midrib, prominent beneath, ascending, anastomosing, the primary reticulations distinct; petioles, pubescent, 1.5 to 2.5 cm. long; stipules caducous, ovate lanceolate, acuminate, densely pubescent. Receptacles in fascicles on the larger branches, 3 to 6 or more fruits in each fascicle, depressed globose or obovoid, about 1.4 cm. in diameter, glabrous, rugose when dry, yellowish when fresh, the pedicels slender, glabrous, about 1.5 cm. long, with three small bracteoles at the apex. Male flowers not seen. Fertile female flowers numerous. Perianth 4-lobed, lanceolate, 1 to 1.5 mm. long. Ovary obovoid, about 1.5 mm. long, the style lateral, stout, about 1 mm. long.

(2849 *Meyer*) March. In forests river cañon at about 900 m. Apparently related to *Ficus sycomoroides* Miq., from Amboina.

11. **F. variegata** Blume; King, l. c. 169. *pl. 212;* Merr. Govt. Lab. Publ. **17** (1904) 14.

(354, 601 *Barnes*) March; (171 *Merrill*). Decades Philippine Forest Fl., coll. *Borden*, April; (779, 1177, 1551, 1625 *Borden*) May, August. In forests 100 to 200 m. Malaya. T., *Tangisang bayauac.*

§ *Sycidium.*

12. **F. ampelas** Burm.; King. l. c. 90. *pl. 114.*

(587 *Barnes*) March; (681 *Borden*) May; (275 *Merrill*) Decades Philippine Forest Fl., coll. *Borden*, August. In forests 150 to 200 m., not previously reported from the Philippines. Malaya.

13. **F. hauili** Blanco, Fl. Filip. ed. **1** (1837) 684; ed. **2** (1845) 475.

(1677, 2014, *Borden*) August, October; (1475 *Ahern's collector*) July; (6771 *Elmer*) November. In thickets and open forests below 150 m., abundant and widely distributed in the Philippines, apparently endemic. T., *Hauili.*

No. 2839 *Meyer*, from forests at 1,100 m., is similar to the above specimens except that it has small apparently immature fruits.

14. **F. rostrata** Lam.; King. l. c. 86. *pl. 110.*

(6159 *Leiberg*) July; (2851, 3116 *Meyer*) March, May; (1210 *Borden*) June. In forests 800 to 1,100 m., scandent. British India and Malaya. T., *Balete.*

15. **F. sinuosa** Miq.; Hook. Lond. Journ. Bot. **7** (1848) 232.

(6023 *Leiberg*) July; (2522 *Meyer*) February; (777, 2559 *Borden*) May, February. Abundant in thickets below 100 m., widely distributed in the Philippines. Endemic (?). T., *Isis.*

One of the most common species of the genus in the Philippines, and exceedingly variable, reduced by King to *Ficus heterophylla* Linn., but *Ficus sinuosa* is always an erect shrub, never scandent.

16. **Ficus validicaudata** Merrill, sp. nov.

A small tree 7 to 8 m. high with small, lanceolate to ovate lanceolate very long-caudate-acuminate leaves, and small axillary solitary long peduncled receptacles. Branches slender, brown, glabrous or slightly scabrous pubescent. Leaves 3 to 6 cm. long, 0.8 to 1.5 cm. wide, sometimes 10 cm. long and nearly 3 cm. wide, subcoriaceous, scabrous, shining, not at all pubescent, entire, the base acute, 3-nerved, the apex long narrowly caudate acuminate, the acumen one third to nearly one half as long as the blade; nerves 4 to 5 on each side of the midrib, distant, rather distinct beneath, anastomosing, the reticulations distinct, lax; petioles 3 to 4 mm. long; stipules glabrous, lanceolate, caducous, about 4 mm. long. Receptacles subglobose, glabrous, red when mature, 4 to 5 mm. in diameter, the peduncles slender, 1 to 1.5 cm. long, with three small bracts at the apex. Fertile female flowers sessile or pedicelled; perianth lobes 5, free, 1.5 to

2 mm. long, lanceolate, oblanceolate or spatulate, surrounding and enclosing the ovary. Ovary ovoid, slightly compressed, 1 mm. long; style sublateral, stout, 0.5 to 1 mm. long. Male flowers and gall flowers not seen.

(1201 *Whitford*) March, 1905. Exposed ridges in the mossy forest at about 1,200 m., also No. 967 *Whitford*, Mount Banahao, Province of Tayabas, Luzon, in forests at about 800 m. A species apparently most closely related to the Malayan *Ficus cuspidata* Reinw., but with long peduncled receptacles.

§ *Synoecia.*

17. **F. bordenii** Merr. Govt. Lab. Publ. **29** (1905) 11.

(1211 *Borden*) June, 1904. In forests at 650 m. Endemic.

18. **F. megacarpa** Merr. l. c. **17** (1904) 14.

(322 *Barnes*) February; (6757 *Elmer*) November; (222 *Merrill*) Decades Philippine Forest Flora, coll. *Borden*, October. In forests 120 to 200 m. Endemic.

§ *Urostigma.*

19. **Ficus bataanensis** Merrill, sp. nov.

Scandent (?). Branches light gray, glabrous 2 to 3 mm. thick. Leaves alternate, coriaceous, elliptical oblong to narrowly obovate oblong, pale when dry, the apex rounded, somewhat acute or very broadly acuminate, the base acute, 4 to 7 cm. long, 1.5 to 3 cm. wide, entire, glabrous, smooth, somewhat shining above, the margins recurved; primary nerves about 12 on each side of the midrib, spreading, somewhat prominent on both surfaces, anastomosing, the secondary nerves and reticulations numerous, rather dense, distinct; petioles stout, rugose, about 5 mm. long; stipules caducous, lanceolate, glabrous, about 14 mm. long. Receptacles subglobose, axillary, solitary, glabrous, red when mature, 12 to 14 mm. in diameter, the peduncle nearly 1 cm. long, slightly pubescent, with two or three scattered small bracts on the upper portion, the ostiole tubular, prominent. Male flowers few only near the ostiole, monandrous, the anther 0.8 mm. long, the perianth lobes exceeding and enclosing the anther, reddish brown. Gall flowers numerous, the perianth lobes 4, reddish brown, lanceolate, 1 to 2.2 mm. long, surrounding and enclosing the ovary. Ovary ovoid, 1.3 mm. long, acute, the style lateral, slender, 1 mm. long, Fertile female flowers similar to the gall flowers but somewhat smaller.

(1175 *Whitford*) March. On exposed ridges in the mossy forest at about 1,200 m.

20. **F. benjamina** Linn. (?). King. l. c. 43., *pl. 52.*

(48 *Whitford*) April; (2427 *Meyer*) January; (2479, 2566 *Borden*) January, February. In forests and thickets below 100 m. British India and Malaya. T., *Balete.*

21. **F. caulocarpa** Miq. *F. infectoria* Roxb. var. *caulocarpa* (Miq.) King, l. c. 63. *pl. 75.*

(3776 *Merrill*) January; (197, 201 *Barnes*) January; (2251 *Meyer*) February; (2551 *Borden*) February; (6706 *Elmer*) November; (67 *Merrill*). Decades Philip. Forest Fl., coll. *Barnes*, January. In forests along the river below 300 m., common and widely distributed in the Philippines. Borneo. T., *Balete.* No. 2493 *Borden*, January, apparently also represents a form of this species.

22. **F. chrysolepis** Miq.; King. l. c. 24. *pl. 20.*

(2387 *Borden*) January. In forests at 650 m. Celebes. T., *Balete.*

23 **F. forstenii** Miq.; King l. c. 29 *pl. 29.*

(1477 *Ahern's collector*) July; (2374 *Borden*) January. In forests below 100 m., Celebes, Timor, Borneo. T., *Payapa, Balete.*

A species differing in some minor characters from *Ficus forstenii* Miq., as figured and described by King, but agreeing so well with that species in essential characters that the material is referred there. *Ficus vidaliana* Warb., differs from our material in the absence of the bracts of the receptacle. If on comparison with authentic material of *Ficus forstenii*, the specimens cited above prove to be sufficiently distinct, I am of the opinion that Blanco's name, *Ficus payapa*, should be adopted for the form here discussed, as his description although short and imperfect applies with sufficient closeness to warrant the adoption of his specific name in such case.

24. **F. indica** Linn.; King l. c. 39. *pl. 45.*

(2063, 2373, 2707 *Borden*) October, February. In forests at about 100 m. Assam and Burma to Malaya. T., *Balete.*

25. **F. retusa** Linn. (?). King, l. c. 50. *pl. 61.*

(2376 *Borden*) January; (1425 *Ahern's collector*) July; (3285 *Merrill*) October. On exposed rocky bluffs on the seashore. Tropical Asia to Malaya and New Caledonia. T., *Baleting bato.*

26. **F. saxophila** Blume; King. l. c. 17. *pl. 12.*

(2588 *Meyer*) February. In thickets at about 25 m. Java, Timor, and Boeroe. T., *Balete.*

27. **Ficus similis** Merrill, sp. nov.

A tree about 12 m. high, apparently starting as an epiphyte. Branches brown, glabrous, striate, the younger parts slightly pubescent. Leaves alternate, oblong-obovate, chartaceous, glabrous, the very young leaves somewhat pubescent on the nerves beneath, shining, rather pale when dry, 9 to 14 cm. long, 3.5 to 5 cm. wide, the apex abruptly short, blunt acuminate, narrowed below to the acute base, the margins entire; nerves 7 to 8 on each side of the midrib, spreading, distant, anastomosing, rather distinct beneath, the reticulations lax, rather obscure; petioles rugose, slightly pubescent or glabrous, 5 to 8 mm. long; stipules caducous, lanceolate, acuminate about 1 cm. long, densely appressed pubescent outside. Receptacles axillary, solitary, subglobose to obovoid, about 1 cm. in diameter, glabrous, or very slightly pubescent, rugose when dry, the peduncles ebracteolate, appressed pubescent, about 5 mm. long. Fertile female flowers numerous, the perianth lobes free, lanceolate, acuminate, 2.5 to 3 mm. long, much exceeding the ovary. Ovary ovoid, rounded, 1 mm. long, the style slender, lateral, 2 to 3 mm. long.

(3031 *Meyer*) May. In forests at 120 m., T., *Balete.* Also No. 1065 *Merrill*, Baler, Province of Principe, Luzon, August, 1902. A species apparently most closely related to *Ficus pubinervis* Blume, differing from that species in its longer peduncled receptacles and glabrous leaves.

28. **F.** sp. (*F. indica* group).

(2031, 2384 *Borden*) October, January. In forests 50 to 900 m., T., *Balete.*

29. **F.** sp. (*F. indica* group).

(2192 *Meyer*) December; (2722 *Borden*) February. In forests at 130 M. T., *Balete.*

30. **F.** sp.

(2316 *Meyer*) December; (2369, 2483 *Borden*) December, January. In forests 100 to 200 m., T., *Balete.*

31. **F.** sp.

(1966 *Borden*) October. In forests at 200 m. T., *Balete.*

6. CONOCEPHALUS Blume.

1. **C. violaceus** (Blanco) Merr. Govt. Lab. Publ. **27** (1905) 80.

(1186 *Borden*) June; (2291 *Meyer*) December; (13, 184 *Whitford*) April, May. River cañon thickets, 100 to 600 m. Endemic. T., *Bagauac.*

URTICACEÆ.

1. LAPORTEA Gaudich.

1. **L. luzonensis** (Wedd.) Warb. in Perk. Frag. Fl. Philip. (1905) 168. *Laportea crenulata* Gaud. var. *luzonensis* Wedd.

(2631 *Meyer*) February; (*Whitford*). In forests at 500 m. Endemic.

2. **L. crenulata** (Roxb.) Gaud.; Wedd. in DC. Prodr. **16** (1869) **1**: 85.

(2850 *Meyer*) March. In forests at 900 m. British India and Malaya.

2. PILEA Lindl.

1. **P. luzonensis** sp. nov.

Glabrous erect, 1 m. high or less, the stems slender. Leaves opposite, lanceolate, long petioled, in unequal pairs, the leaves of each pair similar in shape, but one about one-half the size of the other, serrate throughout, the inflorescence not exceeding the petioles. Leaves glabrous, membranous, strongly 3-nerved, the apex long acuminate, narrowed below to the acute, slightly obtuse or even obscurely narrowly cordate base, the larger ones 11 to 14 cm. long, 3 to 4 cm. wide, the smaller ones of each pair about one half as large; petioles slender, 3 to 4 cm. long; stipules very short; cross nervules many, curved, rather prominent beneath. Dioecious. Female inflorescence congested, axillary, less than 1 cm. long, sepals 3, very unequal, one about 1 mm. long, the other two very much smaller, scarcely embracing the achene. Achene ovate, slightly inequilateral, flattened, 1 mm. long. Male inflorescence short peduncled, the branches slender, 3 to 4 cm. long, the flowers in scattered fascicles 3 to 4 mm. in diameter, each fascicle 10 to 20 flowered. Sepals 4, oblong-oblanceolate, about 1.5 mm. long. Stamens 4; filaments slender; anthers about 0.5 mm. long.

(279, 1129 *Whitford*) May, March. Common in the cañon of the Lamao River on damp shaded banks, 800 to 1,000 m.

3. ELATOSTEMA Forst.

1. **E. longifolium** Wedd.; DC. Prodr. **16** (1869) **1**: 184.

(*Whitford*) May. Common on wet shaded banks along streams, 500 to 600 m. Endemic.

2. **E. sessile** Forst. var. **brongniartianum** Wedd. l. c. 173.

(174 *Whitford*) May; (288 *Copeland*) February. Common on wet shaded banks along the river, 250 to 600 m. The species widely distributed in tropical Asia and Malaya, the variety endemic.

3. **E. whitfordii** Merrill, n. sp.

A succulent, erect, herbaceous or somewhat suffrutescent plant 1 to 2 m. high, with large alternate glabrous leaves, and very short peduncled or sessile fleshy hemispherical receptacles 1 to 2 cm. in diameter. Branches glabrous, succulent, striate when dry, slightly zigzag. Leaves oblong 18 to 22 cm. long, 7 to 9 cm. wide, pale green, inequilateral, slightly falcate, the lamina on one side of the midrib about three-fifths as wide as the portion on the other side, the apex sharply acuminate, the base acute, inequilateral, glabrous, membranous, the upper surface with numerous small irregularly disposed cistoliths, the lower surface with cistoliths only on the reticulations and veins, margins rather strongly serrate-dentate throughout, except near the base which is subentire; lateral nerves 11 to 14 on each side of the midrib, prominent beneath, ascending, branched above but scarcely anastomosing; petioles glabrous, about 1 cm. long; stipules membranous, glabrous, deciduous, narrowly lanceolate, long acuminate, 3 cm. long.

Male flowers numerous, subsessile or the peduncle 4 mm. long, fleshy, succulent, the heads 1 to 2 cm. in diameter, the bracts confluent into a fleshy disk, the tips scarcely free, flowers surrounded by a mulicaginous, transparent substance. Anthers 1 mm. long or less.

(254 *Whitford*) May; (1234 *Borden*) June. Growing on wet shaded banks subject to constant drip of water in cañon of the Lamao River 550 to 800 m. A species apparently related to the Malayan *Elatostema macrophyllum* Brongn.

4. PROCRIS Juss.

1. **P. lævigata** Blume; Hook. f. Fl. Brit. Ind. **5** (1888) 575.

(3884 *Merrill*). On cliffs at 1,000 m. Tropical Asia, Africa, and Malaya. Not previously reported from the Philippines.

5. BŒHMERIA Jacq.

1. **B. blumei** Wedd. in DC. Prodr. **16** (1869) **1**: 204.

(6078 *Leiberg*) July; (6656 *Elmer*) November. Along streams below 100 m. Endemic.

6. PIPTURUS Wedd.

1. **P. asper** Wedd: in DC. Prodr. **16** (1869) **1**: 235.[17]

(72 *Whitford*) April; (2222 *Meyer*) December. In thickets near streams below 100 m. Common and widely distributed in the Philippines. Endemic. T., *Dalunot*.

6. VILLEBRUNEA Gaudichaud.

1. **V. trinervis** Wedd.; DC. Prodr. **16** (1869) **1**: 235.[22]

(2645, 3001 *Meyer*) February, May; (6978 *Elmer*) November; (195 *Barnes*) January. In cañon of the Lamao River, 200 to 700 m. Endemic.

7. LEUCOSYKE Zoll. et Mor.

1. **L. capitellata** (Poir.) Wedd. l. c. 235.[27]

(283 *Whitford*) May; (2543, 2544 *Merrill*) June; (6665 *Elmer*) November. Along streams from near sea level to 900 m. Widely distributed in the Philippines. Malaya.

2. **L. capitellata** var. **celtidifolia** (Gaud.) Wedd. l. c. 235.[28]

(1149 *Whitford*) March; (6976 *Elmer*) November. On exposed ridges 900 to 1,100 m. Certainly only an ecological variety of *Leucosyke capitellata*. Endemic.

PROTEALES.

PROTEACEÆ.

1. HELICIA Lour.

1. **H. cumingiana** Presl; Meissn. in DC. Prodr. **14** (1857) 440.

171, 118, 456, 460 *Whitford*) May, July; (1354 *Borden*) July; (3767 *Merrill*) January; (2599 *Meyer*) February. On exposed ridges above 1,000 m. Endemic.

2. **H. philippinensis** Meissn. l. c. 441.

(836, 1235, 2076, 3060 *Borden*) May, June; (1510 *Ahern's collector*) July; (2602 *Meyer*) February; (342 *Whitford*) May. In forests above 600 m. Endemic.

SANTALALES.

LORANTHACEÆ.

1. LORANTHUS Linn.

1. **L. pentapetalus** Roxb.; Hook. f. Fl. Brit. Ind. **5** (1886) 206.

(80 *Barnes*) November; (2242 *Meyer*) December; (6891 *Elmer*) November; (1219 *Whitford*) April. Parasitic on various trees 50 to 1,000 m. Tropical Asia to Malaya. T., *Galamino.*

2. **L.** sp.

(816, 1814, 2938 *Borden*) March to September. Parasitic on various trees 200 to 650 m.

3. **L.** sp.

(134, 1081 *Whitford*) May, February; (1813 *Borden*) September. Parasitic on *Eugenia* and other trees in forests at 600 m.

4. **L.** sp.

(1171 *Whitford*) March. Parasitic on an undetermined tree in forests at 1,100 m.

2. ELYTRANTHE Blume.

1. **E. ampullacea** (Roxb.) Engl. *Loranthus ampullaceus* Roxb.; Hook. f. Fl. Brit. Ind. **5** (1886) 220.

(86 *Whitford*) April. Parasitic on *Anisoptera vidaliana* Brandis. British India to Malaya.

SANTALACEÆ.

1. HENSLOWIA Blume.

1. **H. lobbiana** A. DC.; Hook. f. Fl. Brit. Ind. **5** (1886) 233.

(1200 *Borden*) June. A parasitic scandent vine on trees in the upper forests. The first species of the genus to be definitely known from the Philippines, *H. philippinensis* A. DC., being from Malacca and not from the Philippines, while the species figured by Vidal, Synopsis, Atlas, *t. 18. f. F.*, as *H. heterantha* Hook. f., is *Exocarpus latifolia* R. Br.

OPILIACEÆ.

1. CHAMPEREIA Griff.

1. **C. cumingiana** (Baill.). *Opilia cumingiana* Baill. Adansonia **3** (1862) 124.

(3810 *Merrill*) April; (32, 1063, 1065 *Whitford*) April, January; (2410, 2519, 2771, 2813 *Meyer*) January, March; (617, 2375, 2733 *Borden*) April, January, March. Common in the lower thickets and extending to an altitude of 700 m.

This species has been identified by Vidal as *Champereia griffithiana* Planch., which is probably correct, but Baillon's name is the earlier. It is possible that *Opilia manillana* Baill., is not distinct. T., *Malalucban.*

2. OPILIA Roxb.

1. **O. amentacea** Roxb.; Laws. in Hook. f. Fl. Brit. Ind. **1** (1875) 583.

(1317 *Whitford*) June; (2356 Borden) January; (2315 *Meyer*) December. Scandent in thickets near the seashore. British India to Malaya and New Guinea.

OLACACEÆ.

1. STROMBOSIA Blume.

1. **S. philippinensis** (Baill.) Rolfe Journ. Bot. **23** (1885) 211 (July); Vidal, Phan. Cuming. Philip. (1885) 23, 102 (November). *Strombosia dubia* Vidal, Sinopsis, Atlas (1883) 20. *t. 30. f. D.*

(639, 660, 661, 1181, 1367, 1737, 1761, 1776, 2742 *Borden*) April to March; (514, 522, 532, 533, 549, 558, 578, 591, 607 *Barnes*) November to January; (2515 *Merrill*) June; (1046 *Whitford*) January. Abundant in the forests 100 to 600 m. Endemic. T., *Camayauan.*

2. OLAX Linn.

1. **O. imbricata** Roxb.; Mast. in Hook. f. Fl. Brit. Ind. **1** (1872) 575.

(2327, 2358, 2705, 2923 *Borden*) December to March; (2281 *Meyer*) December. Scandent in thickets and open forests up to 200 m. Widely distributed in the Philippines. British India and Java.

BALANOPHORACEÆ.

1. BALANOPHORA Forst.

1. **B. decurrens** Fawc. Trans. Linn. Soc. II. **2** (1886) 234. (?).

(3947 *Merrill*) March; (1113 *Whitford*) February. Parasitic on roots of trees on ridges in the mossy forest at 1,000 m. Endemic.

ARISTOLOCHIALES.

ARISTOLOCHIACEÆ.

1. ARISTOLOCHIA Linn.

1. **A. tagala** Cham. Linnaea **7** (1832) 207.

(2342 *Borden*) December. In thickets below 100 m. British India to Malaya.

CENTROSPERMÆ.

AMARANTACEÆ.

1. DEERINGIA R. Br.

1. **D. baccata** (Retz.) Moq. in DC. Prodr. **13** (1849) **2**: 236. *D. celesioides* R. Br.

(2265 *Meyer*) December; (6721 *Elmer*) November. In thickets below 100 m. Widely distributed in the Philippines. Southern China to Australia.

2. **D. indica** Zoll. & Mor. Syst. Verz. (1854–55) 72.

(1594, 3064 *Borden*) April, May; (6671 *Elmer*) November; (6082 *Leiberg*) July; (484 *Whitford*) July. Common in thickets below 100 m., widely distributed in the Philippines. Malaya to New Guinea, etc. T., *Hagorilis.*

2. CYATHULA Lour.

1. **C. prostrata** (Linn.) Blume; Hook. f. Fl. Brit. Ind. **4** (1885) 723.

(2362 *Borden*) January; (1024 *Whitford*) December; (2318 *Meyer*) December. A weed in waste places in openings below 100 m. Tropics of the world.

3. **AERUA** Forsk.

1. **A. lanata** (Linn.) Juss.; Hook. f. Fl. Brit. Ind. **4** (1885) 728.
(*Whitford*) April; (6022 *Leiberg*) July; (6848 *Elmer*) November; (1492 *Ahern's collector*) July. In open places near the seashore. Widely distributed in the Philippines. Asia, Africa and Malaya.

4. **GOMPHRENA** Linn.

1. **G. globosa** Linn.; Hook. f. l. c. 732.
(2033 *Borden*) October. In waste places about dwellings, probably introduced from Mexico. Cultivated in all countries.

AIZOACEÆ.

1. **MOLLUGO** Linn.

1. **M. stricta** Linn.; Clarke in Hook. f. Fl. Brit. Ind. **2** (1879) 663.
(6103 *Leiberg*) July; (3305 *Merrill*) October. A weed along trails below 100 m. Tropical Asia to Malaya and the Fiji Islands.

RANALES.

MENISPERMACEÆ.

1. **CISSAMPELOS** Linn.

1. **C. pareira** Linn.; Hook. f. Fl. Brit. Ind. **1** (1872) 103.
(1604 2015 *Boden*) August, October; (6016 *Leiberg*) July. Common in thickets below 100 m. Widely distributed in the Tropics of the world.

2. **CYCLEA** Arnott.

1. **C.** sp.
(2527 *Merrill*) June; (1215 *Whitford*) April. In thickets 150 to 700 m. Male flowers only.

3. **TINOSPORA** Miers.

1. **T. reticulata** Miers. Ann. & Mag. Nat. Hist. II. **13** (1864) 321.
(2541 *Merrill*) June. In thickets at 150 m. Endemic.

4. **ANAMIRTA** Colebr.

1. **A. cocculus** (Linn.) W. et A.; Hook. f. Fl. Brit. Ind. **1** (1872) 98.
(6652 *Elmer*) November; (3292 *Merrill*) October. In thickets below 100 m. Widely distributed in the Philippines. British India and Malaya.

2. **A.** sp.
(70 *Whitford*) April. In thickets below 100 m. Male flowers only.

5. **LIMACIA** Lour.

1. **L. cuspidata** Hook. f. et Th.; Hook. f. Fl. Brit. Ind. **1** (1872) 100.
(3112 *Meyer*) May. In forests at 800 m. British India and Malaya.

MAGNOLIACEÆ.

1. **TALAUMA** Juss.

1. **T. villariana** Rolfe, Journ. Linn. Soc. Bot. **21** (1884) 307.
(668, 1746 *Borden*) April, August; (551 *Barnes*) March; (2506 *Meyer*) January; (1160 *Whitford*) March. In forests 100 to 1,000 m. Endemic. T., ***Patanguis.***

2. **MICHELIA** Linn.

1. **M. parviflora** Merr. Govt. Lab. Publ. **35** (1906) 70.
(*Borden*) April. Sterile specimen. Endemic.

3. **DRIMYS** Forst.

1. **D. piperita** Hook. f. Icon. Pl. *t. 896.*
(260 *Copeland*) January; (149, 1103 *Whitford*) May, February; (6817 *Elmer*) November. Exposed ridges at 1,100 m. On most of the higher mountains of the Philippines. Borneo and New Guinea.

ANONACEÆ.

1. **UVARIA** Linn.

1. **U. alba** Merr. Govt. Lab. Publ. **17** (1904) 17.
(50 *Barnes*) August; (3024 *Meyer*) May; (6003 *Leiberg*) July; (6637 *Elmer*) November; (1924 *Borden*) September; (3274, 3859 *Merrill*) October, August. In forests 100 to 400 m. Endemic.
2. **U. ovalifolia** Blume, Fl. Jav. Anon. 27.
(3275, 3897 *Merrill*) October, August; (6140 *Leiberg*) July; (1423 *Ahern's collector*) July. Forests, seashore to 300 m. Malaya.
3. **U. rufa** Blume l. c. 19.
(397, 1319 *Whitford*) June. Common in thickets below 100 m. Widely distributed in the Philippines. Malaya. T., *Susong calabao.*
4. **U.** sp.
(2051 *Borden*) October; (3301 *Merrill*) October; (87 *Barnes*) November. In forests below 200 m. Fruits only.

2. **ANAXAGOREA** St. Hil.

1. **A. luzonensis** A. Gray, Bot. Wilke's U. S. Explor. Exped. (1854) 27.
(2214 *Meyer*) December; (2500, 3136 *Merrill*) June, October; (471, 505 *Whitford*) July; (1215, 1229, 1327, 1770 *Borden*) June, August. Abundant in forests above 100 m. Widely distributed in the Philippines. British India and Malaya.

3. **UNONA** Linn. f.

1. **U. clusiflora** Merr. Govt. Lab. Publ. **35** (1906) 13.
(2521, 3769 *Merrill*) June, 1903, January; (1214, 1289 *Whitford*) April, May; (6882 *Elmer*) November. In forests 50 to 600 m. Endemic.

4. **CANANGIUM** Baill.

1. **C. odoratum** (Lam.) Baill. in Koord. & Val. Bijd. Boomsoort. Java **9** (1903) 279. *Cananga odorata* Hook. f. et Th.
(764, 1400 *Borden*) May, July; (2509 *Meyer*) January; (368 *Whitford*) June. In forests up to 200 m., indigenous. Widely distributed in the Tropics by cultivation. T., *Ilang-ilang.*

5. **POLYALTHIA** Blume.

1. **P. flava** Merr. Govt. Lab. Publ. **35** (1906) 12.
(1068 *Whitford*) January; (2052, 2544 *Borden*) October, February; (2514 *Meyer*) January. Forests at about 200 m. Endemic.
2. **P. barnesii** Merr. l. c. **17** (1904) 15.
(596 *Barnes*) March; (760, 802, 3032 *Borden*) May. In forests 100 to 200 m. Endemic.

3. **P. suberosa** Hook. f. et Th.; Hook. f. Fl. Brit. Ind. **1** (1872) 65.

(3096 *Merrill*) October. In thickets below 100 m. British India and Java.

4. **P.** sp.

(2823 *Meyer*) March. Fruit only. A tree in forests at 800 m.

6. GONIOTHALAMUS Blume.

1. **G. elmeri** Merr. Govt. Lab. Publ. **29** (1905) 13.

(2498 *Meyer*) January; (7025 *Elmer*) November; (277, 324 *Whitford*) July. In forests 100 to 900 m. Endemic.

2. **G.** sp.

(1213 *Whitford*) April. A tree in forests at 600 m. Flowers immature, from the trunk of the tree.

7. PHÆANTHUS Hook. f. et Th.

1. **P. cumingii** Miq. Fl. Ind. Bat. **1** (1859) **2**: 51.

(64, 1030 *Whitford*) April, December; (2501 *Merrill*) June; (6679 *Elmer*) November; (2179, 3022 *Meyer*) December, May; (159 *Barnes*) January; (1204, 1659, 1690, 1750 *Borden*) June, August; (1418, 1481, 1491 *Ahern's collector*) August. In forests 70 to 300 m. Endemic. T., *Banitan.*

8. MITREPHORA Blume.

1. **M. ferruginea** Merr. Govt. Lab. Publ. **17** (1904) 16, non Boerl.

(2829 *Meyer*) March; (61, 367, 513 *Barnes*) October, March; (3728 *Merrill*) January; (635, 2045 *Borden*) April, October; (6734, 7000 *Elmer*) November. In forests 100 to 500 m. Endemic. T., *Dalinas.*

This name is invalidated by *Mitrephora ferruginea* Boerl., a Celebes species, but as two species were confused in the original description, no new name is here proposed for the Philippine plant, as flowering specimens have not been seen.

2. **M. lanotan** (Blanco) Merr. l. c. **35** (1906) 71.

(6087 *Leiberg*) July; (1447 *Ahern's collector*) July; (2230, 3016 *Meyer*) December, May; (610, 763, 2364, 2924, *Borden*) April to March; (1250, 1033 *Whitford*) December, May, 1905. In forests 100 to 300 m. Endemic. T., *Dalinas.*

9. OROPHEA Blume.

1. **O. cumingiana** Vidal, Phan. Cuming. Philip. (1885) 17.

(1238, 1315 *Whitford*) May, June. In forests in river cañon, 200 to 300 m. Endemic.

2. **O. maculata** Merr. Govt. Lab. Publ. **35** (1906) 11.

(2389 *Borden*) January; (2418 *Meyer*) January. In forests, 200 to 500 m. Endemic.

10. XYLOPIA Linn.

1. **X. dehiscens** (Blanco) Merr. Forestry Bureau Bull. **1** (1903) 20.

(683 *Borden*) May. In forests at 150 m. Endemic.

11. ARTABOTRYS R. Br.

1. **A. cumingianus** Vidal, Phan. Cuming. Philip. (1885) 169.

(4 *Whitford*) April; (2950 *Borden*) March. In forests at 100 m. Endemic.

2. **A. rolfei** Vidal, Rev. Pl. Vasc. Filip. (1886) 39.

(2925 *Borden*) March; (2828 *Meyer*) March; (3300 *Merrill*) October. In thickets and forests 75 to 200 m. Endemic.

12. **CYATHOCALYX** Champ.

1. **C. globosus** Merr. Govt. Lab. Publ. **17** (1904) 17.

(489, 510, 523, 560 *Barnes*) November, March; (359, 501, 1029 *Whitford*) June, December; (622, 646, 657, 667, 1529, 1536, 1735 *Borden*) April, August. In forests 100 to 200 m. Endemic. T., *Latauan.*

MYRISTICACEÆ.

1. **HORSFIELDIA** Willd.

1. **H. ardisiifolia** (A. DC.) Warb. Monog. Myrist. (1897) 274.

(2487 *Borden*) January. In forests at 200 m. Endemic.

2. **GYMNACRANTHERA** Warb.

1. **G. paniculata** (DC.) Warb. l. c. 370.

(669, 2940 *Borden*) April, March; (174 *Barnes*) January. In forests 100 to 250 m. Endemic. T., *Tairúcan.*

2. **G. lanceolata** Merrill, n. sp.

A medium sized tree. Branches glabrous, gray or dark brown, striate, the ultimate branchlets with very few short ferruginous hairs. Leaves lanceolate, coriaceous, glabrous, dark above, slightly shining, reddish or reddish white beneath, 11 to 14 cm. long, 1.5 to 3 cm. wide, nearly equally and rather abruptly narrowed at both ends, the base acute, the apex acute or merely blunt; primary lateral nerves about 15 on each side of the midrib, reddish brown beneath and somewhat prominent, rather obscure above, the midrib stout, prominent, very slightly pubescent on the lower portion beneath, the reticulations lax, irregular; petioles slightly ferruginous pubescent or nearly glabrous, 1 to 1.5 cm. long. Inflorescence axillary or on the young branchlets below the leaves, 1 cm. long or less, very few flowered, densely ferruginous pubescent throughout, the peduncles 5 mm. long or less. Female flowers (scarcely mature) 2 mm. long, densely ferruginous pubescent with short hairs. Ovary densely ferruginous pubescent. Male flowers and fruits not seen.

(3236 *Meyer*) June. A tree in forests at 800 m.

3. **MYRISTICA** Linn.

1. **M. philippinensis** Lam.; Warb. l. c. 286.

(628, 761, 1791 *Borden*) April, September; (1438 *Ahern's collector*) July; (361 *Whitford*) June; (52 *Barnes*) October. In forests 100 to 200 m. Endemic.

Warburg, to whom specimens were sent, identified Nos. 628 and 761 *Borden*, and 52 *Barnes* as *Myristica guatteriifolia* A. DC., but all the specimens cited above agree more closely with Nos. 829 and 1481 *Cuming* (*M. philippinensis*), than with 1582 *Cuming*, cotype of M. *Guatteriifolia* A. DC. Specimens of Cuming's plants exist in our herbarium. T., *Duguan, Tambalao.*

2. **M. simiarum** A. DC.; Warb. l. c. 397.

(2630 *Meyer*) February; (346, 470 *Whitford*) May, July; (1244 *Borden*) June. In forests at 550 m. Endemic. T., *Paria.*

4. **KNEMA** Lour.

1. **K. heterophylla** (F.-Vill.) Warb. l. c. 573.

(625, 1180, 1372, 1663, 1655, 2556, 2723 *Borden*) April to March; (366, 520 *Whitford*) June, July; (6152 *Leiberg*) July; (2815 *Meyer*) March; (2533 *Merrill*) June; (500 Barnes) November. A tree in forests 50 to 500 m. Common and widely distributed in the Philippines, endemic. Local native names the same as for *Myristica philippinensis. Sterculia glomerata* Blanco is certainly identical, but Blanco's description is very imperfect.

MONEMIACEÆ.

1. KIBARA Endl.

1. **K. ellipsoidea** Merrill, n. sp.

A shrub or small tree about 6 m. high. Branches pale, glabrous. Leaves glabrous throughout, elliptical oblong, subcoriaceous, opposite, rather pale when dry, somewhat shining beneath, entire below, distantly toothed in the upper half, 14 to 17 cm. long, 5 to 7 cm. wide, the apex abruptly short acuminate, the base acute, the teeth irregular, small, 1 to 2 cm. distant; primary lateral nerves prominent beneath, spreading, 7 to 8 on each side of the midrib, anastomosing at 1 cm. from the margin, the reticulations distinct, very lax; petioles 2 to 2.5 cm. long. Female flowers (immature) axillary glabrous, the carpels very numerous, the peduncles elongated in infrutescence, stout, about 2 cm. long, the disk-like receptacle about 1 cm. in diameter in fruit, bearing few mature carpels. Carpels stipitate, ellipsoidal 2 to 2.5 cm. long, about 1.5 cm. thick, glabrous, shining, purple when mature, the stipes about 1 cm. long.

(2843 *Meyer*) March, 1905. In dense forests in cañons at 1,000 m. According to the collector the aboriginal Negritos who inhabit this region use the fruits for food.

LAURACEÆ.

1. CINNAMOMUM Blume.

1. **C. mercadoi** Vidal, Rev. Pl. Vasc. Filip. (1886) 224.

(2482, 2945 *Borden*) January, March; (2626 *Meyer*) February; (1247 *Whitford*) May. In forests 100 to 700 m. Enemic. T., *Samilin, Similin, Calingag.*

2. MACHILUS Nees.

1. **M. philippinensis** Merrill, n. sp.

A small tree 8 to 15 m. high. Branches slender, brown or nearly black, glabrous, striate, the younger branchlets rather densely ferruginous pubescent. Leaves obovate or oblong-obovate, subcoriacous, glabrous or the under surface with few hairs when young or when very young pubescent on both surfaces, often somewhat glaucous beneath, shining above, rather sharply acuminate, narrowed below to the acute base, 5 to 7 cm. long, 1.5 to 3.5 cm. wide, alternate; nerves 6 to 7 on each side of the midrib, ascending, evident beneath but rather obscure above, the reticulations dense; petioles about 1.5 cm. long, glabrous, or when young slightly pubescent. Panicles slender, axillary, few flowered, 6 to 10 cm. long, branched only above the middle, the peduncle, branches, pedicels and calyx lobes uniformly pubescent with short reddish brown hairs, the branches short, spreading, 2 cm. long or less the pedicels 3 mm. long. Flowers hermaphrodite, greenish, fragrant, about 3.5 mm. long. Sepals 6, oblong to oblong-ovate, 2.5 mm. long, the outer three slightly smaller than the inner ones. Outer stamens nearly equaling the sepals their anthers 4-celled, introrse, the anthers of the inner row of stamens extrorse. Ovary glabrous. Fruit subglobose, glabrous, about 8 mm. in diameter, the calyx lobes not persistent.

(1139. 1220 *Whitford*) March, April; (2793 *Meyer*) March. A tree on exposed forested ridges 900 to 1,000 m.

3. NEOLITSEA (Benth.)

(*Litsea* § *Neolitsea* Benth.; *Tetradenia* Nees, 1831, non Benth. 1830.)

1. **N. vidalii** nom. nov. *Litsea verticillata* Vidal, Rev. Pl. Vasc. Filip. (1886) 226, non Hance.

(634, 757, 829, 1904, 3029 *Borden*) May, April. In forests 150 to 400 m. Endemic. T., *Pusopuso.*

2. **N. zeylanica** (Nees). *Litsea zeylanica* C. & Fr. Nees in Amœn. Bot. Bonn. Fasc. **1** (1823) 58; Hook. f. Fl. Brit. Ind. **5** (1886) 178.

(1337, 1586, *Borden*) July, August; (3204 *Merrill*) October; (1503, *Ahern's collector*) July; (6806 *Elmer*) November; (119, 458 *Whitford*) May, July; (2617 *Meyer*) February. On exposed ridges above 1,000 m. Not previously reported from the Philippines. British India and Malaya.

3. **N. microphylla** Merrill, n. sp.

A shrub or small tree. Branches slender, glabrous, striate, brown, the young shoots ferruginous pubescent. Leaves alternate, mostly near the tips of the branchlets, elliptical oblong to ovate lanceolate, with few appressed ferruginous hairs on both surfaces when young, becoming glabrous, 3.5 to 5.5 cm. long, 1 to 2 cm. wide, dark and dull above, glaucous beneath; lateral nerves not prominent, the two subbasal ones sharply ascending, about 4 others on each side of the midrib from about the middle upwards; petioles slender, 1 cm. long, glabrous, shining. Umbels sessile, mostly axillary, subglobose and about 5 mm. in diameter before anthesis, 5-flowered, the four surrounding bracts membranous, elliptical-ovate, about 4.5 mm. long, slightly pubescent. Flowers slightly pubescent, the perianth 4-cleft, the lobes acute narrowly ovate. Ovary glabrous. Stamens in the female flowers usually 2 to 3, sterile. Male flowers not seen. Fruit obovoid, glabrous, 1.5 cm. long, black when dry, the persistent calyx tube funnel shaped, about 5 mm. in diameter at the top.

(6905 *Elmer*) November, 1904. On exposed ridges with the preceding species, differing especially in its much smaller leaves and larger fruits.

4. LITSEA Lam.

1. **L. tersa** (Linn.) *Glabraria tersa* Linn. Mant. (1771) 276. *Litsea chinensis* Lam. Encycl. **3** (1789) 574. *L. sebifera* Pers. Syn. Pl. **2** (1807) 4. *Sebifera glutinosa* Lour. Fl. Cochinch. (1790) 638.

(365 *Barnes*) March; (1285 *Borden*) July; (1255 *Whitford*) May. In forests and thickets below 100 m., common and widely distributed in the Philippines. British India to Southern China, Malaya, and Australia. T., *Pusopuso.*

2. **L. luzonica** (Blume) F.-Vill. Nov. App. (1883) 181.

(134, 344 *Barnes*) January, February; (627, 1356, 1371, 1810 *Borden*) April, September; (2321, 2809, 3002 *Meyer*) December, May; (268 *Copeland*) February; (3183, 3891 *Merrill*) October, August; (271, 345, 469 *Whitford*) May, July, (1453 *Ahern's collector*) July; (6075; 6131 *Leiberg*) July; (6633, 6808 *Elmer*) November, 1904. Common in forests 100 to 1,000 m. Widely distributed in the Philippines, possibly endemic. Variable and apparently closely related to the Malaya *Litsea fulva,* and perhaps not distinct from that species, many of the specimens cited above closely resembling authentic specimens of the latter species.

3. **L. perrottetii** (Blume) F.-Vill. l. c.

(128, 330 *Barnes*) January, February; (2347 *Borden*) January; (1025 *Whitford*) December. In open forests below 100 m., widely distributed in the Philippines. Endemic. T., *Maguilic.*

4. **L.** sp.

(1363, 1794 *Borden*) July, September. Apparently undescribed, fruit only.

5. BEILSCHMIEDIA Nees.

1. **B. glomerata** Merr. Govt. Lab. Publ. **29** (1905) 15.

(335 *Barnes*) February. In forests at 100 m. Endemic. T., *Terukan.*

6. CRYPTOCARYA R. Br.

1. **C. luzoniensis** Vidal, Rev. Pl. Vasc. Filip. (1886) 222.

(1043, 1050 *Whitford*) December, January. In thickets along the river at 100 m. Endemic.

2. **C.** sp.

(3046 *Borden*) May, 1905. In forests at 130 m. Fruit only.

7. ENDIANDRA R. Br.

1. **E. coriacea** Merr. Govt. Lab. Publ. **35** (1906) 14.

(3780 *Merrill*) January; (3066 *Borden*) May; (126, 190 *Barnes*) January. In forests 100 to 200 m. Endemic.

8. PLATEA Blume.

1. **P. latifolia** Blume; Miq. Fl. Ind. Bat. **1** (1855) **1**: 793.

(1202 *Whitford*) March; (2098 *Borden*) November; (6835 *Elmer*) November. In forests 900 to 1,200 m. Java and Sumatra.

The above specimens are with immature fruits and old pistillate flowers, but agree well with the description of the species, and with sterile specimens in our herbarium from Java. No species of the genus has previously been reported from the Philippines.

RHODEALES.

HERNANDIACEÆ.

1. ILLIGERA Blume.

1. **L. luzonensis** (Presl) Merr. Govt. Lab. Publ. **17** (1904) 18.

(2557, 3289 *Merrill*) June, October. In thickets below 50 m. Endemic.

CAPPARIDACEÆ.

1. GYNANDROPSIS DC.

1. **G. pentaphylla** (Linn.) DC.; Hook. f. Fl. Brit. Ind. **1** (1872) 171.

(*Whitford*) April. Waste places near the seashore. Widely distributed in the Philippines, and generally distributed in the Tropics of the world.

2. CAPPARIS Linn.

1. **C. horrida** Linn. f.; Hook. f. l. c. 178.

(2553 *Borden*) February; (2574 *Meyer*) February. In thickets below 75 m., widely distributed in the Philippines, British India and Malaya. T., *Daug*.

2. **C. micracantha** DC.; Hook. f. l. c. 179.

(93 *Whitford*) April; (2223 *Meyer*) December; (2552 *Borden*) February. Common in thickets below 100 m., widely distributed in the Philippines, British India and Malaya. T., *Tinicán*.

3. **C. oblongata** Merr. Govt. Lab. Publ. **35** (1906) 15.

(2632 *Meyer*) February. In forests at 500 m. Endemic.

4. **C.** sp.

(3858 *Merrill*) August; (518 *Whitford*) July. Fruit only. In thickets below 100 m.

3. STIXIS Lour.

1. **S. philippinensis** (Turcz.) Merr. Govt. Lab. Publ. **35** (1906) 72.

(2263 *Meyer*); (2326 *Borden*) December. In forests at 100 m. Endemic. T., *Lanitnit*.

MORINGACEÆ.

1. MORINGA Juss.

1. **M. oleifera** Lam. *M. pterygosperma* Gaertn.; Hook. f. Fl. Brit. Ind. **2** (1876) 54.

(2518 *Meyer*) January. In deserted clearings near the seashore. Commonly cultivated in the Tropics. T., *Malungay.*

SARRACENALES.

NEPENTHACEÆ.

1. NEPENTHES Linn.

1. **N. alata** Blanco, Fl. Filip. ed. 1 (1837) 805.

(3229 *Merrill*) October; (419 *Whitford*) June. On exposed ridges only near the summit of the mountain above 1,200 m. Endemic.

ROSALES.

CRASSULACEÆ.

1. KALANCHŒ Adans.

1. **K. spathulata** DC.; Clarke in Hook. f. Fl. Brit. Ind. **2** (1878) 414.

(284, 1131 *Whitford*) May, March. On rocks in river cañon 800 to 900 m. British India to Southern China and Java.

SAXIFRAGACEÆ.

1. HYDRANGEA Linn.

1. **H. lobbii** Maxim. Mem. Acad. Petersb. VII. 10 (1867) **16:** 15.

(466 *Topping*) May; (2622 *Meyer*) February; (156 *Whitford*) May; (6998 *Elmer*) November. On exposed ridges above 1,000 m. Endemic.

2. ITEA Linn.

1. **I. macrophylla** Wall.; Hook. f. Fl. Brit. Ind. **2** (1878) 408.

(2383 *Borden*) January; (2404, 2615 *Meyer*) January, February. In forests at 900 m. British India and Java.

3. POLYOSMA Blume.

1. **P. philippinensis** Merr. Govt. Lab. Publ. **29** (1905) 16.

(828, 1811, 2079, 2099 *Borden*) June to December; (6795, 6838 *Elmer*) November; (2999 *Meyer*) May; (1206 *Whitford*) March; (1509 *Ahern's collector*) August; (3877 *Merrill*) August. In forests above 600 m. Endemic.

PITTOSPORACEÆ.

1. PITTOSPORUM Banks.

1. **P. pentandrum** (Blanco) Merr.; Govt. Lab. Publ. **27** (1905) 19; l. c. **35** (1906) 16.

(1937 *Borden*) October; (2228 *Meyer*) December; (3177 *Merrill*) October; (6752, 7035 *Elmer*) November; (*Whitford*) June. Common in thickets below 100 m. Widely distributed in the Philippines. Endemic. T., *Mamalis.*

2. **P. odoratum** Merr. Govt. Lab. Publ. **35** (1906) 16.

(1152, 1153 *Whitford*) March; (6902 *Elmer*) November; (2616, 2795 *Meyer*) February, March. On exposed ridges above 1,000 m. Endemic.

3. **P. resiniferum** Hemsl. Kew Bull. (1894) 344; Merr. l. c. 17.

(3729 *Merrill*) January; (2380 *Borden*) January; (2403, 2794 *Meyer*) January, March; (6903 *Elmer*) November; (1141 *Whitford*) March. On exposed ridges above 900 m. Celebes. (?)

CUNONIACEÆ.

1. WEINMANNIA Linn.

1. **W. luzoniensis** Vidal, Rev. Pl. Vasc. Filip. (1886) 125.

(420 *Whitford*) June; (2756, 3123 *Meyer*) February, May; (789, 1227 *Borden*) May, June. On exposed ridges above 700 m. Endemic.

ROSACEÆ.

1. ERIOBOTRYA Lindl.

1. **E. ambigua** Merr. Govt. Lab. Publ. **35** (1906) 19.

(2796 *Meyer*) March; (1155, 1168, 1307 *Whitford*) March, June. On exposed ridges above 900 m. Endemic.

2. PHOTINIA Lindl.

1. **P. luzonensis** Merr. Govt. Lab. Publ. **17** (1904) 18.

(6996 *Elmer*) November; (2120 *Borden*) November; (1161, 1189 *Whitford*) March; (3223, 3714 *Merrill*) October, January. On exposed ridges above 1,000 m. Endemic.

3. RUBUS Linn.

1. **R. moluccanus** Linn.; Hook. f. Fl. Brit. Ind. **2** (1878) 330.

(124 *Whitford*) May; (2842 *Meyer*) March; (3754 *Merrill*) January. On exposed ridges above 1,000 m. British India and Malaya.

2. **R. rosæfolius** Smith. f. l. c. 341.

(6790 *Elmer*) November; (101 *Whitford*) April. On exposed ridges above 800 m. British India and Malaya.

3. **R. tagallus** Cham. et Schlecht. Linnaea **2** (1827) 9.

(203 *Barnes*) January; (*Copeland*) January; (267 *Whitford*) May; (2114 *Borden*) November; (3187, 3766, 3953 *Merrill*) October to March, 1905. On exposed ridges above 1,000 m. Formosa.

4. **R. fraxinifolius** Poir.; Perk. Frag. Fl. Philip. (1904) 118.

(3957 *Merrill*) March. On exposed ridges above 1,000 m. Malaya.

4. PYGEUM Gaertn.

1. **P. latifolium** Miq. Fl. Ind. Bat. **1** (1855) **1**: 361.

(49 *Barnes*) August; (1396, 1575, 1806, 2064, 2366, 3044 *Borden*) July to May; (2629 *Meyer*) February; (6697 *Elmer*) November; (8, 84, 1203 *Whitford*) April, March. Common in thickets and forests 60 to 1,200 m., widely distributed in the Philippines. Malaya. T., *Lago*.

5. PARINARIUM Aubl.

1. **P. griffithianum** Benth.; Hook. f. Fl. Brit. Ind. **2** (1878) 310.

(688, 2724 *Borden*) May, February; (571 *Barnes*) March, 1904. In forests 100 to 200 m., widely distributed in the Philippines. British India and Malaya. T., *Liusin*.

CONNARACEÆ.

1. **CONNARUS** Linn.

1. **C. neurocalyx** Planch. Linnaea **23** (1850) 248.

(2030 *Borden*) October. In thickets at 60 m. Endemic.

2. **AGELAEA** Sol.

1. **A. wallichii** Hook. f. Fl. Brit. Ind. **2** (1876) 47.

(6004 *Leiberg*) July; (3025 *Meyer*) May; (29 *Whitford*) April; (3043 *Borden*) May. In forests 100 to 700 m. Malayan Peninsula. T., *Tayabac*, *Palo Santo.*

3. **ROUREA** Aubl.

1. **R. multiflora** Planch. Linnaea **23** (1850) 418.

(6017 *Leiberg*) July; (323 *Whitford*) May; (2520 *Merrill*) June. In thickets below 100 m., and on ridges at 800 m. Endemic.

2. **R. volubilis** (Blanco) Merr. Govt. Lab. Publ. **27** (1905) 36. *R. heterophylla* Planch. l. c. 419.

(1967 *Borden*) October. In forests at 200 m. Endemic.

4. **CNESTIS** Juss.

1. **C. ramiflora** Griff.; Hook. f. Fl. Brit. Ind. **2** (1876) 54.

(2592 *Meyer*) February; (2567 *Borden*) February; (529 *Topping*) May. Common in thickets below 100 m., widely distributed in the Philippines. British India and Malaya

5. **ELLIPANTHUS** Hook. f.

1. **E. luzoniensis** Vidal, Rev. Pl. Vasc. Filip. (1886) 104.

(1051 *Whitford*) January; (812, 1742, 1909, 2074, 2107, 2926 *Borden*) June to March; (1426, 1505 *Ahern's collector*) August; (6692, 6883, 6889 *Elmer*) November. In forests, 100 to 600 m. Endemic. T., *Banato.*

LEGUMINOSÆ.

1. **PITHECOLOBIUM** Mart.

1. **P. acle** (Blanco) Vidal, Rev. Pl. Vasc. Filip. (1886) 121.

(35 *Whitford*) April; (6688 *Elmer*) November; (366, 507 *Barnes*) March, November; (687, 689, 720 *Borden*) May. In forests mostly along the river below 200 m., widely distributed in the Philippines. Endemic. T., *Acle.*

2. **P. dulce** (Willd.) Benth.; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 303.

(2274 *Meyer*) December; (*Whitford*) April; (63 *Barnes*) October; (1268, 1265 *Borden*) July. In deserted clearings and thickets below 100 m., introduced from Mexico and now spontaneous and widely distributed in the Philippines. T., *Camanchili.*

3. **P. montanum** Benth.; Baker in Hook. f. l. c. 306.

(2746 *Borden*) March. In forests at 500 m. British India and Malaya.

4. **P. prainianum** new name. *P. parvifolium* Merr. Govt. Lab. Publ. **29** (1905) 19, non Benth.

(1179 *Whitford*) March; (3876 *Merrill*) August; (2790 *Meyer*) March. On exposed ridges above 1,000 m. Endemic.

The specific name previously proposed for this species being invalid, the above new name is proposed, in honor of the Director of the Royal Botanic Garden, Calcutta, who has kindly aided me in the identification of various species in this family.

5. **P. lobatum** (Grah.) Benth.; Baker in Hook. f. l. c. 305.

(1257 *Whitford*) May; (1441 *Ahern's collector*) July; (726, 1687, 1933 *Borden*) May, October. In forests, 100 to 300 m., widely distributed in the Philippines. British India and Malaya. T., *Anagap*.

2. ALBIZZIA Durazz.

1. **A. lebbekoides** Benth in Hook. Lond. Journ. Bot. **3** (1844) 89.

(*Whitford*). In thickets below 100 m.

2. **A. procera** (Willd.) Benth.; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 299.

(1270, 1292, 1293, 1300, 1310, 1382, 1555, 1567, 1620, 1823 *Borden*) July to September; (6892 *Elmer*) November; (158 *Barnes*) January; (41 *Whitford*) April. Abundant in open forests and thickets below 100 m., widely distributed in the Philippines. British India and Malaya. T., *Alalangad*.

3. **A. saponaria** Blume; Miq. Fl. Ind. Bat. **1** (1855) **1**: 19.

(1563, 1932 *Borden*) August, October; (1498 *Ahern's collector*) August. In forests below 300 m., widely distributed in the Philippines. Malaya. T., *Gogong toco*.

3. ACACIA Willd.

1. **A. farnesiana** (Linn.) Willd.; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 292.

(7003 *Elmer*) November. In thickets near the seashore, widely distributed in the Philippines, but only in the settled portions. Tropics of the world. T., *Aroma*.

2. **A. intsia** (Linn.) Willd.; Baker l. c. 297.

(3796 *Merrill*) January. In thickets and forests along streams at about 100 m. British India and Malaya.

4. PROSOPIS Linn.

1. **P. juliflora** DC. Prodr. **2** (1825) 447.

(*Whitford*) April; (1264 *Borden*) July; (56 *Barnes*) October. Abundant along the seashore forming dense thickets immediately back of the beach, introduced from Mexico. T., *Aroma*.

5. ADENANTHERA Linn.

1. **A. pavonina** Linn.; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 287.

(1256, 1286 *Whitford*) May; (1496 *Ahern's collector*) August; (3863 *Merrill*) August; (1599, 2345 *Borden*) August, January. Common in open forests below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya.

6. ENTADA Adans.

1. **E. scandens** (Linn.) Benth.; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 287.

(2542 *Borden*) February. In thickets, widely distributed in the Philippines. Cosmopolitan in the Tropics. T., *Gogo*.

7. PARKIA R. Br.

1. **P. roxburghii** G. Don.; Baker l. c. 289.

(89, 323 *Barnes*) November, February; (6888 *Elmer*) November; (1290, 1320, 1518, 1549, 1519, 1614, 1626, 2132 *Borden*) July to September. Abundant in open forests and thickets below 100 m., widely distributed in the Philippines. Malaya. T., *Cupang*.

8. **CYNOMETRA** Linn.

1. **C. simplicifolia** Harms. Notizblatt. Kgl. Bot. Gart. Berlin **3** (1902) 186.

(*Borden, Whitford*). In forests at 500 m., sterile specimens. Endemic.

2. **C. inæquifolia** A. Gray; Baker l. c. 267.

(*Whitford*) September. In forests. Malayan Peninsula. T., *Diladila.*

9. **TAMARINDUS** Linn.

2. **T. indica** Linn.; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 273.

(*Whitford*). Cultivated at Lamao and generally distributed throughout the Philippines. Tropics generally, probably indigenous in Africa. T., *Sampaloc.* The tamarind.

10. **INTSIA** Thou.

1. **I. bijuga** (Colebr.) O. Kuntze. *Afzelia bijuga* A. Gray; Baker l. c. 275.

(1318 *Whitford*) June. Along the seashore, common, widely distributed in the Philippines. Malaya to Polynesia. T., *Ipil.*

11. **PAHUDIA** Miq.

1. **P. rhomboidea** (Blanco) Prain, Sci. Mem. Med. Off. Ind. **12** (1901) 46. *Epura rhomboidea* Blanco. *Afzelia rhomboidea* Vidal. *Intsia rhomboidea* O. Kuntze.

(2046, 2570 *Borden*) October, February; (2591 *Meyer*) February; (*Whitford*) June. In forests below 200 m., widely distributed in the Philippines. Endemic. T., *Tindalo.*

12. **BAUHINIA** Linn.

1. **B. cumingiana** (Benth.) F.-Vill. Nov. App. (1880) 73.

(187 *Barnes*) January; (1442 *Ahern's collector*) July; (2721 *Borden*) February. In open forests below 150 m., widely distributed in the Philippines. Endemic. T., *Banot.*

13. **CASSIA** Linn.

1. **C. alata** Linn.; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 264.

(7015 *Elmer*) November; (2198, 2583 *Meyer*) December, January. In open lands below 100 m., widely distributed in the Philippines. Cosmopolitan in the Tropics. T., *Pacayomcom.*

2. **C. occidentalis** Linn.; Baker l. c. 262.

(1943 *Borden*) October. In dry thickets near the seashore, widely distributed in the Philippines. Cosmopolitan in the Tropics.

3. **C. timorensis** Decne.; Baker l. c. 265.

(2339 *Borden*) December; (361 *Barnes*) March; (2238 *Meyer*) December. In thickets below 50 m., widely distributed in the Philippines. Burma to Malaya and Australia. T., *Balacbac.*

4. **C. tora** Linn.; Baker l. c. 263.

(1944 *Borden*) October; (3170 *Merrill*) October. A weed in waste places, widely distributed in the Philippines. Cosmopolitan in the Tropics.

14. **GLEDITSCHIA** Linn.

1. **G. rolfei** Vidal, Rev. Pl. Vasc. Filip. (1886) 115.

(326 *Barnes*) February. In forests at 100 m., apparently rare. Celebes.

The above identification has been verified by Prain and Rolfe, by comparison with the type of the species at Kew. *G. celebica* Koorders is apparently identical.

15. CÆSALPINIA Linn.

1. **C. bonducella** (Linn.) Flem.; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 254.

(7002 *Elmer*) November; (3284 *Merrill*) October. Common in thickets near the seashore, widely distributed in the Philippines. Cosmopolitan in the Tropics. T., *Calumbibit.*

2. **C. nuga** Ait.; Baker l. c. 255.

(1952, 2492 *Borden*) October, January; (2272 *Meyer*) December; (7009 *Elmer*) November; (1264 *Whitford*) May. Abundant in thickets on the seashore, widely distributed in the Philippines. British Indian to Malaya, Polynesia, and Australia. T., *Sapinit.*

16. MEZONEURUM Desf.

1. **M. glabrum** Desf. Mem. Mus. Paris 4 (1818) 245. *t. 18.*

(*Whitford*). In thickets near the seashore. Malaya.

17. ORMOSIA Jacks.

1. **O. calavensis** Blanco Fl. Filip. ed. 2 (1845) 230.

(223 *Merrill*) Decades Philippine Forest Flora, coll. *Borden,* October. In forests 300 to 500 m. Endemic. T., *Bahay.*

2. **O. paniculata** Merr. Govt. Lab. Publ. **35** (1906) 21.

(2028 *Borden*) October. In forests at 60 m. Endemic.

18 CROTALARIA Linn.

1. **C. quinquefolia** Linn.; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 84.

(*Whitford*) September. A weed in open wet places, widely distributed in the Philippines. British India and Malaya.

2. **C. retusa** Linn.; Baker l. c. 75.

(2021 *Borden*) October. In sandy soil near the seashore, widely distributed in the Philippines. Tropical Asia, Malaya, and Australia.

3. **C. verrucosa** Linn.; Baker l. c. 77.

(2181 *Meyer*) December; (6741 *Elmer*) November; 3308 *Merrill*) October. In waste places from sea level to 200 m., widely distributed in the Philippines. Tropics generally.

19. DALEA Linn.

1. **D. glandulosa** (Blanco) Merr. Govt. Lab. Publ. **27** (1905) 37. *D. nigra* Mart. et Gal.

(*Whitford*). In open lands and thickets below 100 m., introduced from tropical America and now widely distributed in the Philippines, ascending to an altitude of 1,400 m., in the highlands of Benguet Province, Luzon.

20. MILLETTIA W. et A.

1. **M. merrillii** Perk. Frag. Fl. Philip. (1904) 81.

(*Whitford*). In forests. Endemic.

21. GLIRICIDIA H. B. K.

1. **G. sepium** (Jacq.) Steud.; Perk. Frag. Fl. Philip. (1904) 17. *G. maculata* H. B. K.

(2593 *Meyer*) February. In deserted clearings below 75 m. Very common about towns throughout the Philippines, introduced from tropical America. Sp.-Fil., *Cacauate, Madre cacao.*

22. **ZORNIA** Gmel.

1. **Z. diphylla** Pers.; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 147.

(3787 *Merrill*) January. In open grass lands at 75 m. Cosmopolitan in the Tropics.

23. **DESMODIUM** Desv.

1. **D. capitatum** (Burm.) DC.; Baker, l. c. 170.

(*Whitford*) September. In open wet lands, widely distributed in the Philippines. British India and Malaya.

2. **D. gangeticum** (Linn.) DC.; Baker l. c. 168.

(406 *Whitford*) June; (6852 *Elmer*) November; (3104 *Merrill*) October. In open thickets below 75 m. Widely distributed in the Philippines. Tropical Asia, Africa, and Malaya.

3. **D. latifolium** DC.; Baker, l. c. (?)

(2231 *Meyer*) December. In open lands and borders of thickets below 75 m., distribution of the preceding.

4. **D. laxiflorum** DC.; Baker l. c. 164.

(2218 *Meyer*) December. With the preceding. Tropical Asia and Malaya.

5. **D. polycarpum** DC., var. **ovalifolia** (Wall.) Prain in King Mat. Fl. Malay. Penin. **2** (1897) 141.

(227 *Whitford*) May; (3115 *Meyer*) May. On exposed ridges above 1,000 m. Malayan Peninsula and Sumatra.

6. **D. pulchellum** (Linn.) Benth.; Baker l. c. 162.

(3310 *Merrill*) October; (292 *Copeland*) January; (2185 *Meyer*) December. Abundant in open places below 75 m., common and widely distributed in the Philippines. Tropical Asia and Malaya.

7. **D. scorpiurus** Desf. Journ. Bot. **1** (1813) 122. (?)

(3101 *Merrill*) October. In waste places below 50 m.

The above specimen agrees with No. 385 *Merrill*, so identified by Perkins, but there appears to be some doubt as to the correctness of the identification. *Desmodium scorpiurus* Desf., is a native of the West Indies.

8. **D. triflorum** (Linn.) DC.; Baker, l. c. 173.

(*Whitford*) June. In open grass lands below 75 m., widely distributed in the Philippines. Cosmopolitan in the Tropics.

9. **D. umbellatum** (Linn.) DC.; Baker, l. c. 161.

(2026 *Borden*) October. A shrub on the seashore, widely distributed in the Philippines. Tropical Asia, Malaya, and Polynesia.

24. **ALYSCICARPUS** Neck.

1. **A. vaginalis** (Linn.) DC.; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 158.

(407 *Whitford*) June; (6778 *Elmer*) November; (3091 *Merrill*) October. Common in open grass lands below 75 m., widely distributed in the Philippines. Tropical Asia, Africa and Malaya, introduced in America.

35. **PHYLACIUM** Benn.

1. **P. bracteosum** Benn. Pl. Jav. Rar. (1840) 159. *t. 33*.

(2734 *Borden*) March; (6701 *Elmer*) November; (295 *Copeland*) January; (3777 *Merrill*) January. Abundant in thickets along the river below 150 m., widely distributed in the Philippines. Malaya.

26. **DALBERGIA** Linn. f.

1. **D. ferruginea** Roxb.; Prain, Ann. Bot. Gard. Calcutta **10** (1904) 101. *pl. 86*.

(90 *Whitford*) April; (2493 *Merrill*) June; (6028 *Leiberg*) July. Abundant in thickets below 100 m., widely distributed in the Philippines. Malaya.

2. **D. torta** Grah.; Prain l. c. 64. *pl. 42.*

(*Whitford*). In thickets near the seashore. Tropical Asia to Malaya, Australia, and Polynesia.

27. PONGAMIA Lam.

1. **P. glabra** Vent.; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 240.

(1279, 1288, 2044 *Borden*) July, October; (1424 *Ahern's collector*) July. Mostly along the seashore, extending inland a short distance along the river, widely distributed in the Philippines. Tropical Asia, Malaya, and Australia. T., *Bani, Banit.*

28. DERRIS Lour.

1. **D. elliptica** (Wall.) Benth.; Baker l. c. 243. *Millettia piscatoria* Merr. Govt. Lab. Publ **27** (1905) 37, l. c. **29** (1905) 18. *Cylista piscatoria* Blanco; *Galactia* (?) *terminaliflora* Blanco; *Millettia splendens* F.-Vill. non W. et A.

(60 *Whitford*) April. In forests along the river above 100 m. Martaban to the Malayan Peninsula and Archipelago and Celebes.

This species is represented in our herbarium from several different localities, but all of our material is with flowers only. It so far has been found in the Philippines only in thickets and forests bordering rivers. Dr. Prain who has examined specimens states that they closely match the Malayan *Derris elliptica*, but that mature fruits are necessary to definitely determine whether the Philippine plant is a *Derris* or a *Millettia*.

2. **D. multiflora** Benth. in Miq. Pl. Jungh. (1851–55) 253.

(535 *Topping*) May. Endemic.

3. **D. sinuata** (Wall.) Benth.; Baker in Hook. f. Fl. Brit. Ind. **2** (1878) 246.

(1261 *Whitford*) May; (2561 *Merrill*) June. In thickets below 75 m., widely distributed in the Philippines. British India and Malaya.

4. **D. uliginosa** (Willd.) Benth.; Baker l. c. 241.

(*Whitford*) June. In tidal thickets along the seashore, widely distributed in the Philippines. Tropical Asia, Africa, Malaya, and Australia.

29. ABRUS Linn.

1. **A. precatorius** Linn.; Baker in Hook. f. l. c. 174.

(*Whitford*) April. In thickets below 100 m., widely distributed in the Philippines. Cosmopolitan in the Tropics.

2. **A. pulchellus** Wall.; Baker l. c.

(2068 *Borden*) October; (3265 *Merrill*) October; (293 *Copeland*) January; (1034 *Whitford*) December; (6717, 6736 *Elmer*) November. Abundant in thickets below 100 m., widely distributed in the Philippines. Tropical Asia, Africa, and Malaya.

30. ERYTHRINA Linn.

1. **E. indica** Lam.; Baker l. c. 188.

(2235 *Meyer*) December; (1266, 1274 *Borden*) July. In thickets mostly near the seashore, widely distributed in the Philippines. British India to Malaya and Polynesia. T., *Dapdap.*

31. STRONGYLODON Vog.

1. **S. macrobotrys** A. Gray, Bot. Wilke's U. S. Explor. Exped. (1854) 448. *t. 49.*

(57, 160 *Whitford*) April, May; (2808 *Meyer*) March; (262 *Copeland*) January. In forests 650 to 1,000 m. Endemic. T., *Tayabac.*

32. MUCUNA Adans.

1. **M. imbricata** DC.; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 185.

(1028 *Whitford*) December; (3783 *Merrill*) January. Abundant in thickets and open forests below 100 m. British India. T., *Duglo.*

2. **M. pruriens** (Linn.) DC.; Baker l. c. 187.

(1817 *Borden*) September, 1904. In cultivated lands at 75 m. Cosmopolitan in the Tropics.

33. DIOCLEA H. B. K.

1. **D.** sp. (?)

(3050 *Borden*) May. In forests at 100 m. Flowers only.

34. PUERARIA DC.

1. **P. phaseoloides** (Roxb.) Benth.; Baker in Hook. f. Fl. Brit. Ind. **2** (1876) 199.

(6719 *Elmer*) November; (2340 *Borden*) December; (2340 *Merrill*) January. Common in thickets below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya.

35. CANAVALIA Adans.

1. **C. ensiformis** (Linn.) DC.; Baker, l. c. 195.

(3811 *Merrill*) April; (6870 *Elmer*) November; (79 *Barnes*) November. Common in thickets below 50 m., widely distributed in the Philippines. Cosmopolitan in the Tropics.

2. **C. obtusifolia** (Lam.) DC.; Prain in King, Journ. As. Soc. Beng. **66** (1897) **2**: 62.

(3172 *Merrill*) October. In thickets near the seashore, widely distributed in the Philippines. Tropical Asia and Malaya.

36. CAJANUS DC.

1. **C. indicus** Spreng.; Baker, l. c. 217.

(2266 *Meyer*); (2337 *Borden*) December. In thickets and open places below 100 m., widely distributed in the Philippines. Tropics of the world. T., *Caguois, Gablos.*

37. VIGNA Savi.

1. **V. lutea** (Sw.) A. Gray; Baker l. c. 205.

(2295 *Meyer*) December. Sandy seashore, widely distributed in the Philippines. Tropics generally.

38. PACHYRRHIZUS Rich.

1. **P. bulbosus** (Linn.) Britton. *P. angulatus* Rich., Baker l. c. 207.

(1955 *Borden*) October; (54 *Barnes*) October; (3098 *Merrill*) October. Abundant in thickets below 75 m. Widely distributed in the Philippines. Everywhere in the Tropics. T., *Sincamas.*

GERANIALES.

OXALIDACEÆ.

1. BIOPHYTUM DC.

1. **B. sensitivum** DC.; Hook. f. Fl. Brit. Ind. **1** (1874) 436.

(3111 *Merrill*) October; (*Whitford*) September. In waste places and open lands, widely distributed in the Philippines. Tropics of the world.

2. **AVERRHOA** Linn.

1. **A. bilimbi** Linn.; Hook. f. l. c. 439.

(2737 *Borden*) March. In thickets and open forests below 100 m., probably introduced from tropical America, widely distributed in the Philippines and the Tropics generally. T., *Camias*.

RUTACEÆ.

1. **FAGARA** Linn.

1. **F. integrifoliola** Merrill, n. sp. § *Macqueria*.

A tree 13 to 20 m. high, the trunks spineless, except in young plants, the branches with scattered spines, the ultimate branches much thickened, 1.5 to 2 cm. in diameter, with few or no short spines, pale, glabrous. Leaves 45 to 60 cm. long, glabrous, 8 to 9 jugate, alternate, crowded toward the ends of the branches, the common petiole with very few short straight spines on the upper surface in the lower part, the internodes 5 to 7 cm. long; leaflets glabrous, shining, subcoriaceous, oblong to elliptical oblong, 10 to 15 cm. long, 4 to 6 cm. wide, entire, strongly inequilateral at the acute base, the apex usually abruptly acuminate, the acumen blunt or sharp; petiolules 6 to 10 mm. long; nerves 10 to 12 on each side of the midrib, not prominent, the secondary nerves nearly as prominent as the primary ones, the reticulations lax, the midrib spineless. Panicles in the upper axils, 15 to 25 cm. long, glabrous or slightly puberulent, rarely with very few small spines, the lower branches often 10 or 15 cm. long. Flowers white, very fragrant, 4 mm. long, subsessile or their pedicels 1 to 2 mm. long, subtended by 2 or 3 small bracteoles. Sepals 4, glabrous, suborbicular, rounded, about 1 mm. in diameter. Petals 4, glabrous, elliptical or oblong, obtuse, 4 mm. long, 2 mm. wide. Stamens 4, the anthers about 1.2 mm. long. Ovary glabrous. Fruit somewhat ovoid about 8 mm. long, brown or black when dry, glabrous, the pericarp pitted. Seed ovoid, compressed, black and shining, about 6 mm. long.

(88, 336 *Barnes*) November, February, fruit and flower (type); (2351, 2484, 2740 *Borden*) January, March; (2307 *Meyer*) December; (1044, 1295 *Whitford*) January, May.

A species apparently related to *Fagara rhetsa* Roxb. In forests 100 to 200 m. T., *Duso*.

2. **F.** sp. (?).

(1565, 3051 *Borden*) August, May; (1455 *Ahern's collector*) August. In forests 100 to 130 m., staminate flowers and apparently deceased fruits only. T., *Cayetana*.

2. **EVODIA** Forst.

1. **E. glabra** Blume; Hook. f. Fl. Brit. Ind. 1 (1875) 489.

(2947, 3045 *Borden*) March, May. In forests 120 to 150 m. Malaya.

2. **E. triphylla** (Lam.) DC.; Hook. f. l. c. 488.

(2055 *Borden*) October; (6133 *Leiberg*) July; (1474 *Ahern's collector*) August. In forests and thickets below 200 m., widely distributed in the Philippines. Malaya and Burma.

3. **E. retusa** Merrill, n. sp.

A small tree 6 to 8 m. high, nearly glabrous. Branches light gray or the ultimate branchlets brown, glabrous, the terminal buds slightly pubescent. Leaves opposite, trifoliate, glabrous, the petioles 3 to 4 cm. long; leaflets oblong obovate, subcoriaceous, 6 to 10 cm. long, 3 to 5 cm. wide, the lateral ones somewhat inequilateral, narrowed below to the acute base, the apex rounded or obscurely broadly acuminate, retuse, often prominently so, entirely glabrous, paler beneath; nerves

7 to 10 on each side of the midrib, not prominent, irregular; petiolules 2 to 5 mm. long. Inflorescence short, axillary, 2 to 3.5 cm. long, glabrous or slightly pubescent when young, the branches spreading, 1 cm. long or less. Pedicels 1 mm. long, each with 2 small basal bracteoles. Flowers white, small, mostly crowded at the ends of the branchets. Sepals ovate, 1 mm. long, obtuse or acute, slightly pubescent. Petals 4, oblong-obovate, acute, 2 mm. long, 1.2 to 1.4 mm. wide, glabrous. Stamens 4, the filaments 1 mm. long. Ovary pubescent. Fruit brown, glabrous, rugose when dry, about 4 mm. long. Seed somewhat wrinkled, brown, shining, about 2 mm. thick.

(2620 *Meyer*) February, 1905; (1329 *Borden*) July, 1904; (1181 *Whitford*) March, 1905. On exposed ridges in the mossy forest above 1,000 m.

3. **MELICOPE** Forst.

1. **M. luzonensis** Engl. in Perk. Frag. Fl. Philip. (1905) 161.

(3056 *Borden*) May. In forests at 150 m., widely distributed in the Philippines. Endemic.

4. **LUNASIA** Blanco.

1. **L. amara** Blanco, Fl. Filip. ed. 1 (1837) 783.

(745 *Borden*) May; (180 *Barnes*) January; (3161 *Merrill*) October. Common in thickets and forests below 200 m., widely distributed in the Philippines. Celebes. T., *Lunas.*

5. **ACRONYCHIA** Forst.

1. **A. laurifolia** Blume; Hook. f. Fl. Brit. Ind. **1** (1875) 498.

(6045 *Leiberg*) July; (3185, 3870 *Merrill*) October, August; (1333 *Borden*) July; (1147 *Whitford*) March; (6724 *Elmer*) November. On exposed ridges above 1,000 m. Tropical Asia and Malaya.

6. **MICROMELUM** Blume.

1. **M. pubescens** Blume; Hook. f. Fl. Brit. Ind. **1** (1875) 501.

(1434 *Ahern's collector*) August; (2246, 3021 *Meyer*) December, May; (6710, 6872 *Elmer*) November; (381 *Whitford*) June; (75, 359 *Barnes*) November, March; (2513, 3175 *Merrill*) June, October. Abundant in thickets below 100 m., widely distributed in the Philippines. British India to Malaya and Polynesia.

7. **MURRAYA** Linn.

1. **M. exotica** Linn.; Hook. f. l. c. 502.

(1165, 1323 *Whitford*) March, May; (2804 *Meyer*) March. On ridges above 900 m., widely distributed in the Philippines, often cultivated. Tropical Asia, Malaya, Australia, and Polynesia. T., *Camuning.*

8. **CLAUSENA** Burm.

1. **C. anisum-olens** (Blanco) Merr. Govt. Lab. Publ. **17** (1904) 21. *C. warburgii* Perk. Frag. Fl. Philip. (1905) 162.

(1231, 1422, 1796, 3065 *Borden*) June, May; (2509 *Merrill*) June; (1339 *Whitford*) May. Common in open forests and thickets below 100 m., widely distributed in the Philippines. Endemic. T., *Calomata, Mala-anis, Gayomanis.*

9. **ATALANTIA** Correa.

1. **A. disticha** (Blanco) Merr. Govt. Lab. Publ. **27** (1905) 28.

(3118 *Meyer*) May; (3052 *Borden*) May; (1069, 1300 *Whitford*) January, June; (3789 *Merrill*) January. In thickets along the river 100 to 800 m., widely distributed in the Philippines. Endemic. T., *Maladayap, Malacabuyao.*

10. CITRUS Linn.

1. **C. hystrix** DC.; Hook. f. Fl. Brit. Ind. 1 (1875) 515.

(2312, 2766 *Meyer*) December, February; (6828 *Elmer*) November; (1361, 1545, 2736 *Borden*) July, March; (517 *Whitford*) July. In forests 100 to 1,000 m., widely distributed in the Philippines. British India, Malaya. T., *Cabuyao.*

SIMARUBACEÆ.

1. BRUCEA J. S. Muell.

1. **B. luzoniensis** Vidal, Sinopsis, Atlas (1883) 19. *t. 26. f. B.*

(181, 480 *Whitford*) May, July; (6786 *Elmer*) November; (6165 *Leiberg*) July; (1766, 2750 *Borden*) August, March; (2608 *Meyer*) February. In forests 100 to 800 m. Endemic.

2. **B. membranacea** Merrill, n. sp.

A shrub or small tree 5 to 6 m. high, with 3 to 4 jugate, odd pinnate leaves about 20 cm. long, the leaflets nearly glabrous, membranous, subentire or rather distantly toothed above, the inflorescence axillary, 10 cm. long or less. Branches light gray, lenticellate, ferruginous pubescent, the younger ones densely so. Leaves alternate, the rhachis more or less ferruginous pubescent; leaflets ovate to oblong-ovate, base slightly inequilateral, rounded or acute, the apex shortly blunt acuminate, 4 to 6 cm. long, 2 to 3 cm. wide, the midrib above and the midrib and nerves beneath ferruginous pubescent, otherwise glabrous; nerves about 7 pairs; petiolules densely pubescent, 3 to 4 mm. long. Inflorescence densely ferruginous pubescent, axillary, the flowers green, disposed in very small, few flowered cymes along the rhachis, these cymes 1 cm. long or less, rarely more than three flowered. Sepals slightly pubescent. Petals ovate to elliptical ovate, not reflexed, 1.5 mm. long, glabrous. Ovary glabrous. Staminate flowers similar to the pistillate, the stamens very short, not exserted, scarcely exceeding the disk.

(2799, 2800 *Meyer*) March, 1905. On exposed ridges at 1,000 m.

This species agrees in some respects with Vidal's description of *Brucea luzoniensis,* differing from that species as described by Vidal in its broader, not reflexed petals, very short stamens, and smaller leaves and leaflets, agreeing with his description in its short inflorescence. The specimens above referred to *Brucea luzoniensis* all have very much elongated panicles.

2. AILANTHUS Desf.

1. **A. philippinensis** Merr. Govt. Lab. Publ. 35 (1905) 25.

(2719 *Borden*) February. In forests at 150 m. Endemic.

BURSERACEÆ.

1. CANARIUM Linn.

1. **C. ahernianum** Merrill, n. sp.

A tree 20 to 25 m. high. Branches thickened, densely ferruginous pubescent with short hairs, the ultimate branchlets often 1 cm. or more in diameter, the leaf scars large and prominent. Leaves crowded toward the ends of the branchlets, 30 to 40 cm. long, 5 to 6 jugate, the rhachis rather densely ferruginous pubescent, becoming somewhat glabrous in age; leaflets oblong, entire, acuminate, the base rounded, often inequilateral, 10 to 14 cm. long, 4 to 6.5 cm. wide, firm, usually shining on both surfaces, often pale when dry, densely ferruginous pubescent on the midrib above and often somewhat pubescent on the nerves and reticulations, becoming subglabrous, beneath prominently pubescent on the midrib nerves and reticulations, both surfaces strongly, densely reticulate; nerves very prominent beneath, spreading-ascending, anastomosing near the margin, 15 to 20 on each side of the midrib; petiolules 5 to 10 mm. long, densely ferruginous pubescent. Flowers unknown. Panicles in infrutescence short, stout, axillary, about 7 cm. long, very densely ferruginous pubescent. Drupe broadly ovoid, strongly 3-angled, about 3 cm. long, 2 cm. thick, strongly and densely wrinkled reticulate when dry, pale brown, often somewhat glaucous, with few scattered ferruginous hairs, densely ferruginous pubescent at the base, the apex blunt. Persistent calyx 3-lobed, densely ferruginous pubescent on both sides, thick, the lobes 5 to 6 mm. long, the pedicels stout, short.

(123 *Barnes*) January; (1254 *Whitford*) May. Province of Rizal, Luzon (422 *Ahern's collector*) February. In forests 60 to 200 m. According to *Barnes* the tree yields a considerable amount of pitch, and according to *Ahern's collector* the seeds are edible.

A species apparently related to *Canarium bersamifolium* Perk., with which it was at first identified, but distinguished from that species by its ferruginous pubescent leaves, somewhat larger fruits, and other characters.

2. **C. lucidum** Perk. Frag. Fl. Philip. (1904) 94.

(1154 *Whitford*) March. On exposed ridges at 900 m. Endemic. It is possible that No. 296 *Whitford* should also be referred here, but in some respects it seems closer to *Canarium villosum*.

3. **C. luzonicum** (Miq.) A. Gray; Merrill, Govt. Lab. Publ. **29** (1905) 53. *C. carapifolium* Perk. l. c. 91.

(1753 *Borden*) August. In forests at 200 m., widely distributed in the Philippines. Endemic. T., *Pili*.

4. **C. radlkoferi** Perk. l. c. 96.

(329 *Barnes*) February; (2558 *Borden*) February. In forests 15 to 100 m., apparently not abundant. Endemic.

5. **C. villosum** (Blume) F.-Vill.; Merrill, Govt. Lab. Publ. **35** (1906) 27.

(74, 376 *Whitford*) April, June; (2556 *Merrill*) June; (125 *Barnes*) January; (697, 1284, 1311, 1312, 1314, 1319, 1554, 1558, 1564, 1676 *Borden*) May, July. Abundant in thickets and open forests below 100 m., widely distributed in the Philippines. Endemic. T., *Palsahinguin, Pagsahinguin.*

2. SANTIRIA Blume.

1. **S. nitida** Merr. Govt. Lab. Publ. **35** (1906) 29.

(517, 597 *Barnes*) March, November; (638, 808, 2912 *Borden*) May, March; (2786 *Meyer*) February. In forests 100 to 700 m. Endemic. T., *Alupag macsin.*

MELIACEÆ.

1. XYLOCARPUS Kœnig.

1. **X. granatum** Kœnig. *Carapa moluccensis* Lam.; Hiern in Hook. f. Fl. Brit. Ind. 1 (1875) 567.

(*Whitford*) June, 1904. In the strand forest only, widely distributed along the seashore in the Philippines. Tropical Asia, Africa, Malaya, Australia, and Polynesia. T., *Tabiqui.*

2. SANDORICUM Cav.

1. **S. indicum** Cav.; C. DC. l. c. 461.

(1379, 1392, 1640, 1650, 1651 *Borden*) July, August; (357 *Barnes*) March; (77, 377 *Whitford*) April, June. Abundant in forests and thickets below 150 m., widely distributed in the Philippines and frequently cultivated for its edible fruits. Malaya. T., *Santol.*

3. **DYSOXYLUM** Blume.

1. **D. altissimum** Merr. Govt. Lab. Publ. **17** (1904) 25.

(624 *Borden*) April. In forests at 100 m. Endemic. T., *Guso.*

2. **D. cumingianum** C. DC. l. c. 498.

(1332 *Whitford*) May; (2638 *Meyer*) February. In forests in cañons, 400 to 600 m. Endemic.

3. **D. rubrum** Merr. Govt. Lab. Publ. **35** (1906) 32.

(1293 *Whitford*) May; (2013 *Borden*) October. In forests 80 to 180 m. Endemic.

4. **D. turczaninowii** C. DC. l. c. 501. *Amoora macrocarpa* Merr. Govt. Lab. Publ. **17** (1904) 24.

(3731 *Merrill*) January; (6908 *Elmer*) November; (2634 *Meyer*) February; (1365 *Borden*) July; (474, 1199, 1217 *Whitford*) July, March, April. In forests, 500 to 800 m. Endemic. T., *Tan͠glin.*

4. **CHISOCHETON** Blume.

1. **C. cumingianus** (C. DC.) Harms, in Engler und Prantl. Pflanzenfam. **3** (1896) **4:** 294.

(2644 *Meyer*) February; (193, 1314 *Whitford*) May, June. In forests in cañons 225 to 600 m. Endemic. T., *Cato.*

2. **C. philippinus** (Turcz.) Harms, l. c. 296.

(651, 718, 1656, 1689, 1800, 2049 *Borden*) April to October; (78, 518 *Barnes*) November; (2250 *Meyer*) December; (1470 *Ahern's collector*) August; (6127 *Leiberg*) July. Common in forests 100 to 200 m., widely distributed in the Philippines. Endemic. T., *Cato-macsin.*

This species was erroneously referred by the author[1] to *Chisochiton pentandrus* (*Trichilia pentandra* Blanco). Blanco's species is quite distinct however.

3. **C. tetrapetalus** Turcz.; C. DC. Monog. Phan. **1** (1878) 530.

(675, 1653, 1743 *Borden*) May, August; (1482 *Ahern's collector*) August; (1039 *Whitford*) December. In forests 75 to 200 m., widely distributed in the Philippines. Endemic. T., *Agogoy*, also *Cato* and *Cato-macsin.*

6. **REINWARDTIODENDRON** Koord.

1. **R. merrillii** Perk. Frag. Fl. Philip. (1904) 74.

(59, 594, *Barnes*) October, March; (6766 *Elmer*) November; (3149 *Merrill*) October; (1368, 1762, 2060 *Borden*) July, October. In forests 100 to 500 m. Known only from Luzon, a second species of the genus being known from Celebes. T., *Malacamanga.*

7. **AMOORA** Roxb.

1. **A. aherniana** Merr. Govt. Lab. Publ. **17** (1904) 24.

(823 *Borden*) June. In forests at 600 m. Endemic. T., *Cato.*

2. **A. cumingiana** C. DC. l. c. 580.

(522, 1041 *Whitford*) July, January; (2530 *Merrill*) June; (2563 *Borden*) February. In forests below 200 m. Endemic.

8. **AGLAIA** Lour.

1. **A. bordenii** Merr. Govt. Lab. Publ. **17** (1904) 22.

(631, 714, 1749 *Borden*) April, August; (3159 *Merrill*) October; (1231 *Whitford*) April; (1500 *Ahern's collector*) August. In forests 100 to 400 m. Endemic. T., *Potian.*

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[1] Govt. Lab. Publ. 27 (1905) 31.

2. **A. denticulata** Turcz.; C. DC. l. c. 612.

(3008 *Meyer*) May; (1923, 2953 *Borden*) September, March; (6729 *Elmer*) November; (1234 *Whitford*) April; (1450 *Ahern's collector*) July; (2510, 3134 *Merrill*) June, October. In forests 100 to 350., widely distributed in the Philippines. Endemic. T., *Bayanti.*

3. **A. harmsiana** Perk. Frag. Fl. Philip. (1904) 32.

(66 *Whitford*) April; (2255 *Meyer*) December; (62, 503, 616 *Barnes*) October, November, April; (1754 *Borden*) August. In forests 100 to 200 m. Endemic. T., *Malatumbaga.*

I have some doubt regarding the identification of the above specimens, as the leaves are 4 to 6 jugate instead of 2 to 3 jugate as described by Perkins, while our specimens of No. 422 *Ahern* have 5 jugate leaves, this number being cited by Perkins in her description of the species.

4. **A. micrantha** Merr. Govt. Lab. Publ. **29** (1905) 22.

(3120 *Meyer*) May; (104, 215, 477, 1230 *Whitford*) April; (1195 *Borden*) June; (3724 *Merrill*) January. In forests 300 to 700 m., the fruit edible. Endemic. T., *Lansones bundoc, Mansanas.*

5. **A. pauciflora** Merr. l. c.

(6699 *Elmer*) November. Endemic.

6. **A. multiflora** Merr. sp. nov. § *Euaglaia.*

A tree with alternate 4 to 5 jugate leaves, and large axillary many flowered panicles nearly equaling the leaves, the flowers 3 mm. long, the staminal tube free from the petals. Branches finely and densely brownish gray lepidote. Leaves about 35 cm. long, the rhachis about 23 cm. long, more or less lepidote; leaflets alternate, oblong or oblong ovate, 10 to 14 cm. long, 4.5 to 6 cm. wide, chartaceous, dull, glabrous above, only slightly lepidote on and near the veins beneath, short blunt acuminate, the base usually rounded, often strongly inequilateral; lateral nerves prominent beneath, 9 to 12 pairs; petiolules about 5 mm. long. Panicles 20 to 25 cm. long, many branched, the primary branches often 15 cm. long, many flowered, the flowers racemosely disposed, the rhachis, branches, branchlets, short pedicels and calyces more or less brown lepidote, the pedicels about 1 mm. long. Flowers 3 mm. long. Calyx shortly 5 lobed, the lobes acute. Petals 5, glabrous, obong elliptical obtuse, 3 mm. long, 1.5 wide. Staminal tube free from the petals, ovoid or obovoid, much contracted and nearly closed at the apex, glabrous, 3 mm. long. Stamens 5, inserted below the middle of the tube, included, the anthers 1.5 mm. long.

(1420 *Ahern's collector*) July, 1904. In forests. T., *Malatumbaga.*

A species in some respects resembling *Aglœia macrobotrys* Turcz., differing from that species especially in its flowers which are about twice as large. Somewhat resembling *Aglaia turczaninowii* C. DC., but the staminal tube not at all united with the corolla.

7. **A. turczaninowii** C. DC. l. c. 623. *Amoora lepidota* Merr. Govt. Lab. Publ. **17** (1904) 23.

(3173 *Merrill*) October; (1492 *Ahern's collector*) July; (373 *Whitford*) July; (694, 1764, 1964 *Borden*) May to October. In forests 100 to 200 m. Endemic.

A variable species, to which *Amoora lepidota* Merr., must certainly be reduced. The stamens vary from 6 to 10, and frequently the staminal tube is only slightly united with the corolla.

MALPIGHIACEÆ.

1. TRISTELLATEIA Thours.

1. **T. australasica** Rich.; Hook. f. Fl. Brit. Ind. **1** (1874) 418.

(1444 *Ahern's collector*) July. A scandent shrub in thickets along the seashore, widely distributed in the Philippines. Malaya to tropical Australia.

2. **HIPTAGE** Gaertn.

1. **H. luzonica** Merr. Govt. Lab. Publ. **35** (1906) 33.

(1148 *Whitford*) March. A scandent shrub on exposed ridges at 900 m. Endemic.

POLYGALACEÆ.

1. **POLYGALA** Linn.

1. **P. chinensis** Linn.; Benn. in Hook. f. Fl. Brit. Ind. **1** (1872) 204.

(3092 *Merrill*) October; (6109 *Leiberg*) July; (*Whitford*) June. In open dry grass lands below 100 m. Tropical Asia, Malaya, and Australia.

2. **XANTHOPHYLLUM** Roxb.

1. **X.** sp.

(525 *Barnes*) November. A tree in hill forests at 100 m., the specimens sterile. T., *Carra*.

DICHAPETALACEÆ.

1. **DICHAPETALUM** Dup. Th.

1. **D. tricapsulare** (Blanco) Merr. Govt. Lab. Publ. **35** (1906) 35.

(2824 *Meyer*) March; (3191 *Merrill*) October; (145 *Barnes*) January; (2077 *Borden*) November; (6642 Elmer) November. In forests above 700 m. Endemic.

EUPHORBIACEÆ.

1. **ANDRACHNE** Linn.

1. **A.** sp. (?)

(1934 *Borden*) October. Scandent, in forests at 300 m., material imperfect.

2. **FLUGGEA** Willd.

1. **F. obovata** (Linn.) Wall.; *F. microcarpa* Blume; Hook. f. Fl. Brit. Ind. **5** (1887) 328.

(6025 *Leiberg*) July; (390, 534 *Whitford*) June, July; (775 *Borden*) May. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia, Africa, Malaya, and Australia. T., *Bayisit*.

3. **PHYLLANTHUS** Linn.

1. **P. blancoanus** Muell. Arg.; DC. Prodr. **15** (1862) **2**: 420.

(237 *Whitford*) May; (3179, 3751 *Merrill*) October, January. In forests and on exposed ridges above 700 m., also represented by No. 98 *Bolster* and No. 3830 *Merrill*, from Mount Arayat, Province of Pampanga, Luzon, and No. 2698 *Ahern's collector*, Bosoboso, Province of Rizal, Luzon. Endemic.

Phyllanthus blancoanus Muell. Arg., was based on *P. niruri* Blanco, non Linn. =*P. tetrander* Blanco, non Roxb., and being known only from Blanco's description, has previously been a doubtful species. The above specimens although not agreeing perfectly with Blanco's description, are the only ones I have seen that closely approach the species as described by him, and accordingly are so referred.

2. **P. buxifolius** (Blume) Muell. Arg. l. c. 426.

(3010 *Meyer*) May; (2532 *Merrill*) June; (2932 *Borden*) March; (1501 *Ahern's collector*) July. In forests 100 to 250 m. Java.

3. **P. niruri** Linn.; Muell. Arg. l. c. 406.

(3157 *Merrill*) October. In open places along streams and in thickets below 100 m., widely distributed in the Philippines. Tropics generally.

4. **P. reticulatus** Poir.; Muell. Arg. l. c. 344.

(6702 *Elmer*) November; (2715 *Borden*) February. In thickets below 100 m. Tropical Asia and Malaya.

5. **P. stipularis** Merrill sp. nov.

A small shrub or undershrub 1 to 2 m. high. Branches brown, more or less furfuraceous ferruginous pubescent. Leaves alternate, oblong ovate, 4 to 9 cm. long, 1 to 2.5 cm. wide, narrowed above to the sharply acute or slightly acuminate apex, the base inequilateral, rather abruptly acute, glabrous and dark above when dry, white or pale beneath and very slightly furfuraceous pubescent, membranous; nerves 5 to 6 on each side of the midrib, distant, indistinct, the reticulations obsolete or nearly so; petioles 2 to 3 mm. long, somewhat furfuraceous; stipules linear, persistent, slightly furfuraceous, 5 to 8 mm. long. Male flowers fascicled, red, 5 to 6 or more in each axil, the pedicels slender, 5 mm. long or less. Calyx glabrous the sepals 4, free, ovate-lanceolate, acute or blunt, 2.5 to 3 mm. long, about 1.5 mm. wide, the margins slightly irregularly crenate. Disk scales free, thick, fleshy, truncate, often nearly 1 mm. long. Stamens 4, the filaments united, very short or the anthers sessile, the anther cells 4, horizontal, their tips contiguous but not confluent. Rudimentary ovary O. Female flowers solitary in the upper axils, long pedicelled. Sepals 6, imbricate, in 2 series, ovate lanceolate, acute, 2 to 2.3 mm. long, 1 to 1.3 mm. wide. Disk scales similar to the males. Ovary subglobose, about 1 mm. in diameter, 6 ridged, 3 celled, each cell 2 ovuled; styles 6, stout, about 0.3 mm. long, bifid or cleft at the apex. Fruit red, glabrous, subglobose, dehiscent, about 1.5 cm. in diameter, dry, the sepals persistent, somewhat accrescent.

(282, 1102 *Whitford*) May, February; (2841 *Meyer*) March; (2087 *Borden*) *November*; (*Copeland*) January; (6804 *Elmer*) November. On exposed ridges in the mossy forest above 1,100 m.

4. GLOCHIDION Forst.

1. **G. album** (Blanco) Boerl. *Phyllanthus albus* Blanco; Muell. Arg. l. c. 306.

3162, 3797, 3873 *Merrill*) January, October, August; (1765 *Borden*) August; (127 *Barnes*) January; (33 *Whitford*) April; (6663 *Elmer*) November; (2224, 2818 *Meyer*) December, March. In forests 100 to 500 M. Celebes.

2. **G. littorale** Blume. *Phyllanthus littoralis* Muell. Arg. l. c. 280.

(1276 *Whitford*) May. On bluffs at the seashore. Malaya to British India.

3. **G. llanosi** Muell. Arg. *Phyllanthus llanosi* Muell. Arg. l. c. 308.

(2289 *Meyer*) December; (6860 *Elmer*) November; (1774 *Borden*) August; (3131 *Merrill*) October. In open forests 100 to 250 m. Endemic. T., *Banitan, Talicud.*

4. **G.** sp.

(1172, 1327 *Whitford*) March, May. On exposed ridges in the mossy forest above 1,000 m.

5. **G.** sp.

(6106 *Leiberg*) July; (1427 *Ahern's collector*) July. In thickets below 50 m.

6. **G.** sp.

(2716 *Borden*) February. In thickets near the seashore.

5. BREYNIA Forst.

1. **B. cernua** Muell. Arg. l. c. 439.

(391 *Whitford*) June; (1357, 1600 *Borden*) July, August; (534 *Topping*) May. In thickets and forests from near the sea level to 700 m. Malaya. T., *Matang olang.*

2. **B. acuminata** Muell. Arg. l. c. 442.

(6422, 6753 *Elmer*) November; (399 *Whitford*) June; (6107 *Leiberg*) July; (2189, 3009 *Meyer*) December, May; (1495 *Ahern's collector*) July. In thickets and forests 25 to 300 m. Endemic.

6. CYCLOSTEMON Blume.

1. **C. bordenii** Merr. Govt. Lab. Publ. **17** (1904) 26.

(671, 673, 2372, 2395 *Borden*) May, January; (2398, 2415, 2819 *Meyer*) January, March; (1031 *Whitford*) December; (333, 542, 546, 563, 573 *Barnes*) February, March; (182 *Merrill*) Decades Philip. Forest Fl., coll. *Borden*, May. In forests 100 to 500 m. Endemic. T., *Dila dila, Talimorung.*

2. **C. cumingii** Baill.; Muell. Arg. l. c. 485.

(1269, 1275 *Whitford*) May. On bluffs along the seashore. Endemic.

3. **C. monospermus** Merrill, sp. nov. § *Stenogynium.*

A tree 4 to 12 m. high. Branches light gray or brownish, striate, glabrous, lenticellate. Leaves coriaceous, elliptical oblong to broadly oblong lanceolate, 4 to 9 cm. long, 1 to 4 cm. wide, the apex rounded, blunt or very obscurely broadly acuminate, retuse, the base acute, regular or very slightly inequilateral, glabrous, shining above, dull beneath, the primary nerves 8 or 9 on each side of the midrib, obscure, anastomosing, the secondary veins and reticulations nearly as prominent; petioles glabrous, 5 to 8 mm. long. Male flowers fascicled, on short axillary or extra-axillary bracteate peduncles, the buds globose. Sepals 4, broadly elliptical-ovate to suborbicular ovate, rounded, glabrous except the slightly ciliate margins, about 2 mm. long. Stamens 4; filaments 2 mm. long, glabrous; anthers elliptical-ovoid, about 1 mm. long the alternating disk segments thick, fleshy, narrowly ovate, about 1 mm. long. Female flowers with calyx of the male. Ovary ovoid, glabrous, 2-celled, each cell 2-ovuled, the disk annular; style O; stigmas dilated, fleshy, more or less connate into a somewhat lobed disk. Fruit about 1 cm. long, 8 mm. in diameter, glabrous, fleshy, white, becoming gray or blackish when dry, ovoid or ellipsoid, 1-celled, 1-seeded.

(2802, 3122, 3235 *Meyer*) March, May, June; (1232 *Whitford*) April; (1225 *Borden*) June. In the upper forests and on exposed ridges in the mossy forest 650 to 1,250 m.

4. **C. microphyllus** Merr. l. c. 27.

(2260 *Meyer*) December; (175, 494 *Barnes*) January, November; (252, 340, 1027, 1229 *Whitford*) May, December, April; (640, 672, 836 bis, 1253, 2329 *Borden*) April, June, December. In forests 100 to 800 m. Endemic. T., *Tulumorung, Irani, Pangirani, Tangnaranig.*

7. APOROSA Blume.

1. **Aporosa sphæridophora** Merrill, sp. nov.

A tree 10 to 15 m. high. Branches dark reddish brown, striate, glabrous, the older ones more or less grayish. Leaves alternate, subcoriaceous, ovate to oblong or elliptical ovate, acuminate, the base acute, rarely somewhat rounded, often somewhat inequilateral, 8 to 15 cm. long, 3 to 7 cm. wide, glabrous, dark colored and dull or shining above, paler and shining beneath; nerves rather obscure above, somewhat prominent beneath, ascending, 6 to 7 on each side of the midrib, the reticulations distinct; petioles 1.5 to 2 cm. long, glabrous, somewhat swollen and rugose above. Male flowers yellow, in dense, more or less interrupted, simple, axillary spikes 2 to 5 cm. long, the rhachis and bracts ferruginous pubescent, the bracts subreniform, to broadly ovate, about 1.5 mm. long. Sepals 4, in two series, rounded at the apex, pubescent, 1 to 1.2 mm. long, the two inner ones smaller than the two outer. Stamens 2; filaments glabrous, 2 to 2.5 mm. long;

anthers orbicular ovoid, 0.5 mm. long. Female flowers yellow, in axillary, solitary or fascicled spikes 1 to 3 cm. long, the rhachis, bracts, pedicels and calyces rather densely ferruginous pubescent, the flowers few, scattered, one in each bract, the pedicels about 1 mm. long. Sepals elliptical ovate, rounded or acute. Ovary glabrous, 2-celled, each cell 2-ovuled; styles stout, recurved, 2-cleft, persistent. Fruit globose, indehiscent, brown, glabrous and shining when dry, about 1 cm. in diameter, dry, 2-celled, each cell with a single seed, the pedicels 4 to 5 mm. long.

(133, 146, 198 *Barnes*) January; (732, 818, 834, 1373 *Borden*) May, June, July; (3762 *Merrill*) January; (1451 *Ahern's collector*) July; (6086 *Leiberg*) July. In forests 300 to 900 m. Nos. 6101 and 6225 *Elmer*, Sablan, Province of Benguet, Luzon, April, 1904 are the same.

2. **Aporosa symplocosifolia** Merrill. sp. nov.

A small tree 5 to 8 m. high, the leaves usually pale yellowish green when dry. Branches light gray or brownish, glabrous. Leaves alternate, subcoriaceous, oblong ovate or elliptical ovate to broadly elliptical lanceolate, glabrous, shining on both surfaces 6 to 15 cm. long, 2 to 5 cm. wide, the apex usually rather long acuminate, the base rounded or acute, equilateral, entire; nerves about 7 on each side of the midrib, distant, anastomosing, the primary reticulations lax; petioles 1 to 1.5 cm. long, glabrous, flattened and with two small glands at the apex on the upper side. Male flowers in simple, dense, solitary or fascicled, axillary catkin-like spikes about 1 cm. long 2 mm. in diameter, the bracts very slightly pubescent, reniform, 1.5 mm. long, 2 to 2.5 mm. wide. Sepals ovate, acute, about 1.5 mm. long. Filaments about 1 mm. long, glabrous, the anthers 0.5 mm. long. Female flowers on stout, solitary or fascicled, simple, bracteose, pubescent spikes less than 1 cm. long. Sepals 4, broadly ovate, 1.5 to 2 mm. long, their margins ciliate. Ovary glabrous, 2-celled, each cell 2-ovuled. Stigmas short, stout, more or less spreading and somewhat pectinate. Fruit red when mature, sessile, ovoid to ellipsoid, glabrous, 1 cm. long or less, dry, dehiscing from the base, 2-celled, each cell with 1 or 2 seeds.

(3764, 2497 *Merrill*) June, January; (1187, 2361, 2541, 2745 *Borden*) June, January to March; (53, 99, 303, 1055, 1073 *Whitford*) April, May, January; (202 *Barnes*) January; (2320, 2512, 2820 *Meyer*) December, January, March. In forests 100 to 800 m. Other specimens from Luzon are Nos. 383, 910 *Maule*, Province of Zambales, and Nos. 394, 403, 1099, 2657, 3086, 2894 *Ahern's collector*. Province of Rizal.

8. BACCAUREA Lour.

1. **B. tetrandra** (Baill.) Muell. Arg. l. c. 465.

(662, 1217, 2368, 2486 *Borden*) April, June, January; (2504 *Merrill*) June; (334, 531 *Barnes*) February, November; (55, 1038, 1053, 1054 *Whitford*) April, December, January; (2399, 2400, 2811 *Meyer*) January, March. In forests 90 to 600 m. Endemic. T., *Dilac.*

9. ANTIDESMA Linn.

1. **A. bunius** (Linn.) Spreng.; Muell. Arg. l. c. 262.

(754, 1778 *Borden*) May, August; (415 *Whitford*) June; (2559 *Merrill*) June. In thickets below 75 m., widely distributed in the Philippines. British India and Malaya. T., *Bignay.*

2. **A. edule** Merr. Govt. Lab. Publ. **17** (1904) 26.

(6085, 6091 *Leiberg*) July; (52, 476, 521 *Whitford*) April, July; (3148, 3784 *Merrill*) October, January; (167, 547 *Barnes*) January, March; (2739 *Borden*) March (144 *Merrill*) Decades Philip. Forest Fl., coll. *Ahern's collector*, July. In forests and thickets 75 to 400 m. Endemic. T., *Tanigi.*

3. **A. ghæsembilla** Gaertn.; Muell. Arg. l. c. 251.

(1783, 2333 *Borden*) August, December; (2245 *Meyer*) December. In thickets below 75 m., widely distributed in the Philippines. Tropical Asia, Africa, and Malaya. T., *Bignay pogo.*

4. **A. leptocladum** Tul.; Muell. Arg. l. c. 253.

(728, 2058, 3034 *Borden*) May, October; (6125 *Leiberg*) July; (1316 *Whitford*) June; (2498 *Merrill*) June. In forests and thickets 30 to 250 m. Malaya. T., *Bignay.*

5. **Antidesma lucidum** Merrill, sp. nov.

A small tree 6 to 9 m. high, glabrous throughout. Branches brown or grayish, slender, glabrous. Leaves alternate, elliptical ovate to oblong ovate, subcoriaceous, glabrous, shining on both surfaces, usually dark above and paler beneath when dry, 4 to 9 cm. long, 1.5 to 4 cm. wide, entire, the base acute, the apex broadly blunt acuminate, the acumen blunt, apiculate or retuse; nerves 5 to 6 on each side of the midrib, distant, anastomosing, the reticulations very lax; petioles glabrous, 3 to 5 mm. long; stipules small, deciduous. Inflorescence axillary and terminal, glabrous, slender, spicate, or the spikes in few-branched panicles 6 cm. long or less. Male flowers sessile or nearly so, scattered, each subtended by a small acute bract less than 0.5 mm. long, usually solitary or rarely two or three togather. Calyx glabrous, cup shaped, obscurely 4 or 5 toothed or subtruncate. Stamens 4 to 5 in flowers on the same plant; filaments 1.6 mm. long, the anthers cells 0.4 mm. long, the disk fleshy, thickened. Fruit red when mature, wrinkled when dry, somewhat compressed, glabrous, ovoid, 6 to 7 mm. long, the persistent style small, terminal.

(2642, 2775 *Meyer*) February; (1135 *Whitford*) March; (7005 *Elmer*) November. In forests 700 to 900 m. A species in vegetative characters similar to *Antidesma rostratum* Tul., differing from that species, and from *A. leptocladum*, and *A. pleuricum* in being quite glabrous.

10. **BISCHOFIA** Blume.

1. **B. trifoliata** (Roxb.) Hook. f. *B. javanica* Blume; Muell. Arg. l. c. 478.

(65 *Barnes*) November; (*Whitford*) June; (3 *Merrill*) Decades Philip. Forest Flora, coll. *Barnes*, December. In forests along streams 75 to 200 m., widely distributed in the Philippines. Tropical Asia to Malaya and Polynesia. T., *Tuay.*

11. **BRIDELIA** Willd.

1. **B. stipularis** (Linn.) Blume; Muell. Arg. l. c. 499.

(2023 *Borden*) October; (3139 *Merrill*) October; (6769 *Elmer*) November; (92 *Whitford*) April. In thickets below 100 m., abundant, widely distributed in the Philippines. Tropical Asia and Africa to Malaya. T., *Lubalub.*

2. **B. tomentosa** Blume, var. **lancæfolia** (Roxb.) Muell. Arg. l. c. 502.

(2262 *Meyer*) December; (6754 *Elmer*) November; (1405, 1916, 2346 *Borden*) July, September, January; (3087 *Merrill*) October. In thickets below 100 m., widely distributed in the Philippines. Timor. T., *Argai.*

12. **CROTON** Linn.

1. **C. consanguineus** Muell. Arg. l. c. 619.

(2637, 2814 *Meyer*) February, March. In forests 550 to 900 m. Endemic.

2. **C. leiophyllus** Muell. Arg. l. c. 573.

(1433, 1467 *Ahern's collector*) July, August; (2543 *Borden*) February; (2298 *Meyer*) December. In thickets near the seashore. Endemic.

13. CLAOXYLON Juss.

1. **C. rubescens** Miq. var. **oblanceolatum** var. nov.

Similar to the species, but with oblanceolate to oblong oblanceolate leaves, abruptly acute or acuminate, tapering below to the acute base. Fruit subglobose, fleshy, white when fresh.

(1222, 1760 *Borden*) June, August; (2763 *Meyer*) February; (1480 *Ahern's collector*, in part) July; (3112 *Merrill*) October. In forests 100 to 800 m.

2. **Claoxylon rubescens** Miq., **meyenianum** Muell. Arg. l. c. 788.

(2918 *Borden*) March. In forests at 180 m. Endemic.

14. TREWIA Linn.

1. **Trewia ambigua** Merrill, sp. nov.

A tree 8 to 12 m. high with penninerved leaves, axillary and terminal inflorescence and 1-celled fruits. Diœcious. Branches brown, glabrous, the younger branchlets finely brownish puberulent. Leaves opposite, ovate to lanceolate ovate, chartaceous, glabrous throughout or bearded in the vein axils beneath, 10 to 20 cm. long, 4.5 to 9.5 cm. wide, dull or slightly shining, the apex short or rather long acuminate, the base acute, the margins subentire to obscurely coarsely undulate or crenate undulate, often with few scattered glands; nerves 8 to 9 on each side of the midrib, prominent beneath; petioles 1.5 to 6 cm. long, somewhat pubescent. Male inflorescence axillary, racemose, 5 to 8 cm. long, densely brownish puberulent, the flowers solitary or 3 to 6 in the axil of the same bract, the buds globose, sessile or short pedicelled. Sepals 4, ovate to oblong ovate, acute, about 3 mm. long, pubescent outside. Stamens indefinite; filaments glabrous, about 1.3 mm. long; anthers 2-celled, about 0.3 mm. long. Female inflorescence axillary, racemose, 4 to 7 cm. long, long peduncled, pubescent, few flowered, the pedicels about 2 mm. long, one flower in each bract, the bracts ovate, decidous. Ovary oblong ovoid, 1-celled, 1-ovuled, puberulent, the disk wanting. Style single, undivided, stout, in old flowers 5 to 6 mm. long, densely covered with stout forked or branched processes 1.5 to 2 mm. long. Fruit (immature) ovoid, about 1.5 cm. in diameter, brown, crustcaeous, 1-celled, 1-seeded, indehiscent, tipped by the base of the style.

(2798 *Meyer*) March; (623, 1251 *Borden*) April, June. In forests 100 to 800 m. The following specimens are the same: Province of Rizal, Luzon (2977, 3180 *Ahern's collector*) April, July; (2271 *Merrill*) May.

Differing from *Trewia* in its 1-celled, 1-ovuled ovaries and 1-celled, 1-seeded fruits, and in its penninerved leaves, but apparently referable to the genus.

15. MALLOTUS Lour.

1. **M. moluccanus** (Linn.) Muell. Arg. l. c. 958.

(63 *Whitford*) April; (765 *Borden*) May. In thickets below 100 m., common and widely distributed in the Philippines. Tropical Asia and Malaya. T., *Taquip asin.*

2. **M. muricatus** (Wight) Muell. Arg. l. c. 972, in part. (2555 *Merrill*) June; (3011 *Meyer*) May; (26, 378, 386 *Whitford*) April, June. In forests and thickets 75 to 250 m. Malaya.

3. **M. philippinensis** (Lam.) Muell. Arg. l. c. 980.

(1556, 1919, 2726 *Borden*) August, September, March; (1486 *Ahern's collector*) July; (67 *Whitford*) April; (2551 *Merrill*) June. In forests and thickets 50 to 150 m., widely distributed in the Philippines. Tropical Asia to Malaya and Australia. T., *Banato.*

4. **M. playfairii** Hemsl. Journ. Linn. Soc. Bot. **26** (1894) 441?

(2057, 2357 *Borden*) October, January; (2317 *Meyer*) December; (1462 *Ahern's collector*) July. In thickets along the seashore. T., *Binunga.*

This Formosan species was described from staminate specimens only, and I am unable to determine the exact identity of the Philippine form at the present time.

5. **M. repandus** (Rottl.) Muell. Arg. l. c. 981.

(6749 *Elmer*) November. In forests, generally distributed in the Philippines. Tropical Asia to Malaya and New Caledonia.

6. **M. ricinoides** (Pers.) Muell. Arg. l. c. 963.

(2846 *Meyer*) March. In forests at 800 m., widely distributed in the Philippines. Tenasserim to Southern China. T., *Alim.*

7. **M.** sp.

(2612 *Meyer*) February. In forests at 500 m., an apparently undescribed species, in fruit only.

16. ALCHORNEA Sw.

1. **A. javensis** (Blume) Muell. Arg. l. c. 905.

(3795 *Merrill*) January; (3027 *Borden*) May. In forests 75 to 100 m. Burma to Southern China and Malaya.

17. MACARANGA Thouars.

1. **M. bicolor** Muell. Arg. l. c. 1010.

(641, 722, 1294, 1296, 1569, 1570, 2913 *Borden*) April to August; (9, 17 *Whitford*) April; (165 *Merrill*) Decades Philip. Forest Fl., coll. *Borden* April; (3018 *Meyer*) May; (6858 *Elmer*) November. In forests 100 to 250 m. Endemic. T., *Binunga, Bilua.*

2. **M. cumingii** Muell. Arg. l. c. 1005.

(2650 *Meyer*) February. On exposed ridges in the mossy forests at 1,300 m. Endemic.

3. **M. mappa** (Linn.) Muell. Arg. l. c. 1000.

(2059, 2951 *Borden*) October, March; (12, 1052 *Whitford*) April, January; (2309 *Meyer*) December; (6731 *Elmer*) November. In thickets and open forests below 120 m., common and widely distributed in the Philippines. Malaya. T., *Bilua.*

4. **M. tanarius** (Linn.) Muell. Arg. l. c. 997.

(2296 *Meyer*) December; (392 *Whitford*) June; (2473 *Borden*) January. In thickets along the seashore, widely distributed in the Philippines. Malayan Peninsula and Archipelago. T., *Binunga, Bilua.*

5. **M.** sp.

(521 *Barnes*) November. Forests at 100 m. Sterile specimens apparently closely related to *Macaranga hispida* Muell. Arg. T., *Cabal.*

18. ACALYPHA Linn.

1. **Acalypha cardiophylla** Merrill, sp. nov.

A small tree about 7 m. high, diœcious. Branches light gray, glabrous, the younger parts densely cinerous puberulous, also with few scattered long ciliate hairs. Leaves alternate, broadly ovate, membranous, 8 to 15 cm. long, 8 to 12 cm. wide, nearly glabrous above, or pubescent on the veins, glandular punctate, beneath more or less puberulous at least on the midrib and nerves when young, and with few long scattered hairs, the apex short acuminate, the base broad, rounded or cordate, the margins crenate-serrate to subentire; basal nerves 5, the lateral nerves about 7 on each side of the midrib, curved-ascending, distinct, the reticulations subparallel, distinct; petioles 6 to 12 cm. long, puberulent; stipules lanceolate or ovate lanceolate, pubescent, deciduous, 4 to 5 mm. long.

Staminate inflorescence axillary, slender, spicate, many flowered, densely light gray pubescent, often 20 cm. long, the flowers fascicled, sessile, ebracteolate, the buds globose. Sepals 4, oblong-ovate, acute, pubescent, about 1 mm. long. Stamens 8; filaments about 0.5 mm. long, free, the anther cells divergent. Pistillate inflorescence slender, axillary, solitary, spicate, simple, 15 to 25 cm. long, densely light gray pubescent. Flowers rather distant, sessile, ebracteolate, solitary. Calyx 1 mm. in diameter or less, 3-lobed. Ovary globose or ovoid, densely pubescent, 3-celled, about 1.5 mm. in diameter; styles 5 to 6 mm. long, fimbriate.

(2506 *Merrill*) June; (1249 *Ahern's collector*) August. In thickets below 100 m., a species well characterized by its very long, slender, ebracteolate, densely pubescent spikes.

2. **A. stipulacea** Klotz.; Muell. Arg. l. c. 807.

(2640, 2847, 2848 *Meyer*) February, March. In forests 600 to 900 m. Malaya to New Guinea.

19. TRAGIA Linn.

1. **T.** sp.

(2910 *Borden*) March. Scandent, in forests at 200 m., a characteristic species with oblong, cordate leaves, with few stinging hairs. Specimens with immature fruit.

20. HOMONOYA Lour.

1. **H. riparia** Lour.; Muell. Arg. l. c. 1023.

(6 *Whitford*) April; (6777 *Elmer*) November; (2237 *Meyer*) December; (286 *Copeland*) January; (724 *Borden*) May. Along the borders of, and on gravel bars in the bed of the Lamao River below 300 m., abundant. Along most streams throughout the Philippines. Tropical Asia to Java. T., *Bayanti, Lumanaia.*

21. JATROPHA Linn.

1. **J. curcas** Linn.; Muell. Arg. l. c. 1080.

(384 *Whitford*) June; (2582 *Meyer*) February; (7017 *Elmer*) November; (6122 *Leiberg*) July. In old clearings below 100 m., a native of tropical America, now planted throughout the Philippines. T., *Tangantangan.*

22. MANIHOT Adans.

1. **M. utilissima** Pohl.; Muell. Arg. l. c. 1064.

Occasionally cultivated (*Whitford*). A. native of tropical America, now generally cultivated throughout the Philippines. The Tapioca or Cassava. T., *Camoting cahoy.*

23. CODIÆUM Rumph.

1. **Codiæum** (?) **luzonicum** Merrill, sp. nov.

Erect, unbranched, shrubby, 0.8 to 1.6 m. high. Stems gray or brown, glabrous, the younger portions somewhat ferruginous pubescent, the leaf scars large and prominent. Leaves alternate, more or less crowded at the tip of the stem, chartaceous, glabrous, somewhat shining, narrowly oblong obovate to oblong oblanceolate, entire, the apex abruptly acute or rounded, gradually narrowed below to the acute, often rather abruptly cuneate base, 20 to 30 cm. long, 5 to 11 cm. wide; nerves 13 to 15 on each side of the midrib, prominent beneath, spreading, distant, the reticulations very lax; petioles stout, 2 to 4 cm. long. Diœcious. Male inflorescence terminal or axillary, racemose, erect, 20 to 40 cm. long, the rhachis stout, appressed pubescent. Flowers white, the buds globose, the pedicels 5 to 10 mm. long, slender, pubescent, usually fascicled. Sepals, 5, orbicular ovate, rounded, about 5 mm. long, appressed hirsute pubescent outside. Petals none.

Stamens about 100; filaments free, glabrous, about 3 mm. long; anther cells on the margin of the rather broad connective, parallel, the cells somewhat confluent at the apex, the filaments straight in bud, the anthers erect, the disk glands about 1 mm. long. Female inflorescence similar to the male but the pedicels shorter, the flowers solitary, scattered, the bracts minute or wanting. Ovary densely hirsute, 3-lobed, 3-celled; style arms 6, slender, glabrous, about 2.5 mm. long. Fruit dry, 3-celled, dehiscent, about 1 cm. in diameter, glabrous. Seed about 6 mm. long, pale brown, marked with reddish brown dashes.

(2216) *Meyer*) December; (1908 *Borden*) September; (273 *Whitford*) May; (6886 *Elmer*) November; (2517 *Merrill*) June; (*Copeland*) February. In forests 300 to 600 m. Differing from typical *Codiæum* in the absence of the petals and in the numerous stamens.

24. DIMORPHOCALYX Thwaites.

1. **Dimorphocalyx longipes** Merrill, sp. nov.

A tree 10 to 12 m. high. Branches brown, glabrous, the younger parts often slightly pubescent. Leaves alternate, long petiolate, oblong, entire, or slightly, obscurely repand-crenate and with distant minute glandular teeth, the apex short acuminate, the base acute or obtuse, glabrous, shining, submembranous, dark colored when dry, 9 to 20 cm. long, 3 to 6 cm. wide; nerves 11 to 12 on each side of the midrib, distant, distinct beneath, anastomosing, the reticulations very lax; petioles 2 to 10 cm. long, slender, glabrous. Diœcious. Male inflorescence axillary, spicate, 3 to 10 cm. long, glabrous or slightly pubescent, the flowers purplish, sessile in fascicles of from 3 to 6 or more, the bracts small. Sepals 5, slightly united below, oblong ovate to obovate, obtuse, 2 to 2.5 mm. long. Petals 5, imbricate, free, obtuse, glabrous, elliptical ovate, about 2.5 mm. long. Stamens 5, the filaments very short and united or wanting, the anthers more or less united in a globose head 1 mm. in diameter, the cells parallel, not confluent. Pistillate inflorescence a narrow panicle, or a reduced raceme or spike, 5 to 15 cm. long, the bracts oblong, foliaceous, persistent, 5 to 8 mm. long, the flowers solitary or fascicled, sessile or pedicelled. Calyx and corolla of the male. Ovary 3-celled, 1 ovule in each cell, the styles very short, 3, erect, each cleft. Sepals accrescent persistent, about 5 mm. long in young fruit.

(1066 *Whitford*) January; (1801 *Borden*) September. In forests 175 to 250 m. No. 2699 *Merrill*, Bosoboso, Province of Rizal, Luzon, is apparently the same.

25. ENDOSPERMUM Benth.

1. **E. peltatum** Merr. Govt. Lab. Publ. **25** (1905) 35.

(716, 1669, 1672, 1747, 2754 *Borden*) May, August, March. In forests 100 to 200 m. Endemic. T., *Callucoy*.

26. EXCŒCARIA Linn.

1. **E. agallocha** Linn.; Muell. Arg. l. c. 1220.

(1271 *Whitford*) May. In thickets along the seashore, generally distributed throughout the Philippines. Tropical shores of Asia, Malaya, Australia, and Polynesia. T., *Butabuta*.

2. **Excœcaria philippinensis** Merrill sp. nov.

A shrub or small tree 3 to 8 m. high. Branches brown, striate, glabrous. Leaves alternate, oblong lanceolate to oblong oblanceolate, short blunt acuminate, gradually narrowed below to the acute base, entire, subcoriaceous, glabrous, pale when dry and somewhat shining, 7 to 20 cm. long, 1.5 to 4.5 cm. wide; nerves 18 to 20 on each side of the midrib, distant, spreading, indistinct, anastomosing, the reticulations somewhat lax; petioles 1 to 3 cm. long, usually slender, glabrous.

Diœcious. Staminate inflorescence axillary, spicate, 10 cm. long or less, solitary or fascicled, glabrous or nearly so. Bracts subreniform to ovate, glabrous, about 1 mm. long, apiculate, each subtending a solitary flower, the calyx lobes very small, 3, lanceolate, acuminate, less than 1 mm. long. Stamens 3; filaments glabrous, 1.5 mm. long; anthers didynamous, about 1 mm. thick, 0.8 mm. long. Pistillate inflorescence similar to the staminate but shorter, few flowered. Sepals 3, broadly triangular ovate, acute, about 1 mm. long slightly glandular at the apex. Ovary ovoid, glabrous, 3-celled, each cell 1-ovuled; styles 3, stout, recurved, slightly united below, about equaling the ovary. Fruit dry, dehiscent, 3-celled, glabrous, about 1 cm. in diameter, the valves somewhat twisted in dehiscence, the seed globose, smooth, mottled, about 4 mm. in diameter.

(138 *Barnes*) January; (112, 1137 *Whitford*) May, March; (1358, 1359, 2749, 2934 *Borden*) July, March; (2768 *Meyer*) February; (2529, 3189 *Merrill*) June, October; (6001 *Leiberg*) July. In forests 300 to 1,000 m.

27. HOMALANTHUS Juss.

1. **H. populneus** (Geisel.) Pax in Engl. und Prantl. Nat. Pflanzenfam. **3** (1890) **5:** 96.

(478, 1281 *Whitford*) July, May; (1209 *Borden*) June. In open forests 100 to 500 m. Malaya.

28. SAPIUM P. Br.

2. **Sapium lateriflorum** Merrill, sp. nov.

A tree reaching a height of 25 m., monœcious. Branches usually slender, brown or gray, glabrous. Leaves alternate, elliptical ovate to elliptical oblong, coriaceous, glabrous, entire, slightly shining, 7 to 14 cm. long, 3 to 6 cm. wide, the apex short, abruptly acuminate, the base acute, slightly glandular auriculate; primary nerves 6 to 7 each side of the midrib, distant, curved, not prominent, the reticulations lax, rather obscure; petioles 1 to 3 cm. long, glabrous. Inflorescence lateral, axillary or extra-axillary, in simple or paniculate spikes or spicate racemes, glabrous, 3 to 8 cm. long, the staminate flowers above numerous, the pistillate below in the same inflorescence, few, pedicellate, the basal portion of the racemes often with numerous, small imbricated bracts. Staminate flowers yellow, sessile or pedicelled, fasciculate, the subtending bracts rugose, ovate, acuminate, about 1.5 mm. long, 2 to 4 or 5 flowers in each bract. Sepals 2, broadly ovate, acute or obtuse, about 1.5 mm. long. Stamens 2; filaments stout, about 1 mm. long; anthers 2-celled, broadly ovoid or subglobose, about 0.8 mm. long. Disk and petals none. Pistillate flowers few, solitary, pedicelled, at the base of the staminate spike or on branches from the base of the inflorescence. Calyx of the male. Ovary ovoid, glabrous, 2-celled, each cell 1-ovuled. Styles 2, entire, stout, recurved, about 1 mm. long. Fruit subglobose to obovoid, baccate, glabrous, inequilateral, 1-celled, 1-seeded, indehiscent, the peduncles 1.5 to 2 cm. long, the styles persistent.

(2565 *Borden*) February; (338 *Barnes*) February. In forests 100 to 200 m. The following specimens are the same: (1991 *Ahern's collector*) Bosoboso, Province of Rizal, Luzon, November; (1080 *Clarke*) Island of Ticao, May. A species differing from typical *Sapium* in its lateral inflorescence.

29. EUPHORBIA Linn.

1. **E. pilulifera** Linn. Hook. f. Fl. Brit. Ind. **5** (1887) 250.

(6021 *Leiberg*) July; (402 *Whitford*) June. A weed in waste places and open lands below 100 m., widely distributed in the Philippines. Tropical and subtropical regions generally.

SAPINDALES.

BUXACEÆ.

1. **BUXUS** Linn.

1. **B. rolfei** Vid. Rev. Pl. Vasc. Filip. (1886) 233.

(1254, 3054 *Borden*) June, May. A small tree in forests 100 to 400 m. Endemic.

ANACARDIACEÆ.

1. **BUCHANANIA** Spreng.

1. **B. florida** Schauer, var. **arborescens** Engl. in DC. Monog. Phan. 4 (1883) 189.

(695, 1306, 1315, 1401, 1617, 2016, 2056, 2126, 2127 *Borden*) May to November; (6746, 6756, 6843 *Elmer*) November; (2225, 2791 *Meyer*) December, March; (79, 375, 1072, 1138 *Whitford*) April to March; (3276 *Merrill*) October; (124 *Barnes*) January. From the seashore to the summit of the mountain, but never in the dense forest, widely distributed in the Philippines. British India and Malaya. T., *Balinhasay.*

2. **MANGIFERA** Burm.

1. **M. altissima** Blanco; Merr. Govt. Lab. Publ. **17** (1904) 27.

(642, 643, 830 *Borden*) April, June; (2807 *Merrill*) April; (356, 484, 485, 487, 502 *Barnes*) November, March; (355 *Whitford*) June. A tree of the river bottom forests above 75 m., widely distributed in the northern Philippines. Endemic. T., *Pahutan.*

2. **M. indica** Linn.; Engler in DC. Monog. Phan. 4 (1883) 198.

(94 *Whitford*) April; (2248 *Meyer*) December; (1289, 1393 *Borden*) July. Cultivated and frequent in deserted clearings below 100 m., common throughout the Philippines and generally cultivated throughout the Tropics. The mango. T., *Manga.*

3. **ANACARDIUM** Linn.

1. **A. occidentale** Linn.; Engler l. c. 219.

(172 *Barnes*) January; (2323, 2344 *Borden*) December. Cultivated and also occasional in deserted clearings, introduced from tropical America and widely distributed in the Philippines. The cashew nut. T., *Casuy, Balubad.*

4. **SPONDIAS** Linn.

1. **S. lutea** Linn.; Engler l. c. 244.

(*Whitford*) March. Cultivated, generally distributed in cultivation throughout the Philippines, introduced from tropical America. Sp.-Fil., *Siruelas.*

2. **S. mangifera** Willd.; Engler l. c. 248.

(160 *Barnes*) January; (353 *Whitford*) June. In forests at about 100 m. British India and Malaya. T., *Libas.*

5. **DRACONTOMELUM** Blume.

1. **D. cumingianum** Baill.; Engler in DC. Monog. Phan. 4 (1883) 254.

(1, 354 *Whitford*) April, June; (360, 499 *Barnes*) March, November; (747, 1207, 1673 *Borden*) May to August. In forests 50 to 250 m., rather common. Endemic. T., *Lamio.*

2. **D. mangiferum** Blume; Engler l. c. 251.

(1528, 1648, 1670 *Borden*) August. A tree in thin forests and thickets below 100 m., common and widely distributed in the Philippines. Burma to Borneo and Java. T., *Dao.*

6. KOORDERSIODENDRON Engl.

1. **K. pinnatum** (Blanco) Merr. Forest. Bur. Bull. **1** (1903) 33; Govt. Lab. Publ. **35** (1906) 73.

(353, 515, 557, 567, 602, 606 *Barnes*) January, March; (358 *Whitford*) June; (649, 1611, 1618, 1646, 1664, 1678, 1787 *Borden*) April to August; (2575 *Meyer*) February. Common in forests 75 to 150 m., widely distributed in the Philippines. Celebes and New Guinea. T., *Amuguis*.

7. SEMECARPUS Linn. f.

1. **S. albescens** Kurz; Engler in DC. Monog. Phan. **4** (1883) 488.

(337 *Barnes*) February; (674, 708, 1193 *Borden*) May, June; (2777 *Meyer*) February. In forests 100 to 600 m. British India. T., *Ligas*.

The above specimens agree fairly closely with No. 1776 *Cuming* referred by *Engler* to the above species.

2. **S. gigantifolia** F.-Vill. Nov. App. (1883) 350; Vidal, Sinopsis, Atlas, (1883) *t. 36. f. A*.

(2491 *Merrill*) June, 1903. In forests along the river at 100 m., ascending to about 1,000 m. in northern Luzon (Lepanto). Endemic.

3. **S. micrantha** Perk. Frag. Fl. Philip. (1904) 27. (?)

(2388 *Borden*) January; (2422 *Meyer*) January. An endemic species to which the above specimens are doubtfully referred, both numbers being with fruit only.

4. **S. perrottetii** March.; Engler l. c. 480.

(2513 *Meyer*) January; (1302, 1305, 2720 *Borden*) July, February. In open forests and thickets below 100 m., widely distributed in the Philippines. Celebes. T., *Ligas*.

This species and some others of the genus have the same poisonous effect on some persons as *Rhus toxicodendron* Linn.

CELASTRACEÆ.

1. CELASTRUS Linn.

1. **C. paniculata** Willd.; Laws. in Hook. f. Fl. Brit. Ind. **1** (1875) 617.

(81, 414 *Whitford*) April, June; (6747 *Elmer*) November; (3298 *Merrill*) October. Common in thickets below 100 m., widely distributed in the Philippines. British India and Malaya.

HIPPOCRATEACEÆ.

1. SALACIA Linn.

1. **S. integrifolia** sp. nov.

A scandent shrub reaching a height of 12 m. and a diameter of 7 cm., entirely glabrous, with oblong lanceolate to elliptical lanceolate subcoriaceous entire leaves, the flowers fasciculate, axillary, 10 to 20 flowers or more in each axil. Branches light brown, glabrous. Leaves opposite, 7 to 10 cm. long, 2 to 4.5 cm. wide, scarcely drying black, usually pale brown beneath, the base acute, the apex short blunt acuminate; nerves 5 to 6 on each side of the midrib, obscure above, somewhat prominent beneath; petioles 5 to 6 mm. long. Flowers numerous, yellowish brown, the pedicels slender, glabrous, about 1 cm. long. Calyx glabrous. Petals suborbicular to subreniform, obtuse, 2 mm. long. Fruit subglobose, dark yellow when mature, glabrous, fleshy, 2 to 2.5 cm. in diameter, usually with two elliptical, compressed seeds about 1.5 cm. long.

(2550 *Borden*) February; (2517 *Meyer*) January; (1313 *Whitford*) June. The first two numbers are with flowers, the last with fruit. In thickets and forests 100 to 300 m., along the river. T., *Matang olang*.

A species apparently closely related to *Salacia verrucosa* Wight, which has been credited to the Philippines, but the branches of the specimens cited above are scarcely verrucose, while the calyx lobes are entirely glabrous, not fringed with rusty hairs.

2. **HIPPOCRATEA** Linn.

1. **H. obtusifolia** Roxb. (?); Laws. in Hook. f. Fl. Brit. Ind. 1 (1875) 623.

(2712 *Borden*) February. In thickets below 50 m., the material imperfect, flowers only, but not agreeing very closely with the figure given by Wight.

2. **H. indica** Willd.; Laws. in Hook. f. Fl. Brit. Ind. 1 (1875) 624.

(1469 *Ahern's collector*) July. In thickets below 100 m. Tropical Asia, Africa, and Malaya.

STAPHYLEACEÆ.

1. **TURPINIA** Vent.

1. **S. pomifera** DC.; Hiern in Hook. f. Fl. Brit. Ind. 1 (1875) 698.

(645, 686, 762, 1189, 1257, 1376 *Borden*) April to July; (2502, 2546 *Merrill*) June; (488 *Whitford*) July; (509, 535, 544, 570, 599 *Barnes*) November, March; (2600, 3012 *Meyer*) February, May. Common in forests 100 to 500 m., widely distributed in the Philippines. British India to Southern China and Malaya. T., *Malabago*.

ICACINACEÆ.

1. **GONOCARYUM** Miq.

1. **G. tarlacense** Vid. Sinopsis Atlas (1883) XX. *t. 30. f. C.*

(636, 831, 1366, 1803, 2106, 2744 *Borden*) April to November; (2199, 2643 *Meyer*) December, February; (6884, 6887 *Elmer*) November; (475, 1212 *Whitford*) July, April. Forests 100 to 700 m. T., *Malasamat*.

An endemic species apparently very closely related to *Gonocaryum teysmannianum* Scheff., from the Moluccas.

2. **URANDRA** Thwaites. (?)

1. **U.** sp. (?)

(711, 1926, 2949 *Borden*) May to September; (562, 574 *Barnes*) March. A tree in forests 100 to 250 m. T., *Mabunot*.

ACERACEÆ.

1. **ACER** Linn.

1. **A. philippinum** Merr. Govt. Lab. Publ. **35** (1906) 36.

(3872 *Merrill*) August. A small tree on exposed ridges above 1,000 m. Endemic.

SAPINDACEÆ.

1. **ALLOPHYLUS** Linn.

1. **A. dimorphus** Radlk. Act. Congr. Bot. Amst. 1877 (1879) 126.

(6019 *Leiberg*) July; (1262, 1605 *Borden*) July, August. A shrub or small tree in dry thickets below 75 m. Endemic.

2. **A. filiger** Radlk. l. c.

(2547, 3263, 3882 *Merrill*) June to October; (1255, 1745 *Borden*) June, August; (482 *Whitford*) July. Common in dry thickets below 100 m. Endemic.

2. **ERIOGLOSSUM** Blume.

1. **E. rubiginosum** (Roxb.) Blume; Radlk. in Perk. Frag. Fl. Philip. (1904) 60.

(1272 *Whitford*) May. In thickets near the seashore, widely distributed in the Philippines. British India to Malaya and tropical Australia. T., *Calayo.*

3. **OTOPHORA** Blume.

1. **O. fruticosa** Blume, Rumphia **3** (1837) 142. *Capura pinnata* Blanco; *C. purpurata* Blanco; *Otolepis nigrescens* Turcz.; *Capura nigrescens* Vidal; *Otophora pinnata* Merr.

(3808 *Merrill*) April; (294 *Copeland*) January; (2335 *Borden*) December. Common in thickets below 100 m., widely distributed in the Philippines. Malaya. T., *Balinaonao.*

4. **EUPHORIA** Commers.

1. **E. cinerea** (Turcz.) Radlk. Sizb. Phys. Phys.-Math. Acad. Muench. **8** (1878) 299.

(65, 364, 528 *Whitford*) April to July; (331 *Barnes*) February; (2278, 2784 *Meyer*) December, February; (648, 832, 2349 *Borden*) April, January. Common in the hill forests 100 to 600 m., widely distributed in the Philippines. Endemic. T., *Alupag.*

5. **LITCHI** Sonn.

1. **L.** sp.

(2812 *Meyer*) March; (2919 *Borden*) March; (1322 *Whitford*) June. In forests 200 to 500 m. A new species, teste *Radlkofer* in lit.

6. **GUIOA** Cav.

1. **G. aptera** Radlk. in Perk. Frag. Fl. Philip. (1904) 62.

(141 *Barnes*) January; (2785 *Meyer*) February. In forests up to 600 m. Endemic.

2. **G. lasiothyrsa** Radlk. l. c. 63.

(3718 *Merrill*) January, 1904. On exposed forested ridges at about 1,000 m. Endemic.

3. **G. perrottetii** (Blume) Radlk. Sitzb. Math.-Phys. Acad. Muench. **8** (1878) 302.

(2244 *Meyer*) December; (85 *Whitford*) April; (182 *Barnes*) January; (2053, 2328 *Borden*) October, December; (2537 *Merrill*) June; (6635, 6867 *Elmer*) November. Abundant in thickets below 100 m., widely distributed in the Philippines. Endemic. T., *Salab, Ngisingisi.*

7. **ARYTERA** Blume.

1. **A. litoralis** Blume, Rumphia **3** (1837) 170.

(1242 *Whitford*) May; (1466, 1476 *Ahern's collector*) July; (2589 *Meyer*) February; (772 *Borden*) May. In thickets below 75 m., widely distributed in the Philippines. British India and Malaya. T., *Alasan.*

8. **MISCHOCARPUS** Blume.

1. **M. fuscescens** Blume, Rumphia **3** (1837) 169.

(*Whitford*). In forests. Malaya.

2. **M. triqueter** Radlk. in Perk. Frag. Fl. Philip. (1904) 65.

(*Whitford*). In forests. Endemic.

9. LEPIDOPETALUM Blume.

1. **L. perrottetii** Blume, Rumphia **3** (1837) 172.

(2710 *Borden*) February. In thickets below 100 m. Endemic.

10. GANOPHYLLUM Blume.

1. **G. obliquum** (Blanco) Merr. Govt. Lab. Publ. **27** (1905) 30. *G. falcatum* Blume.

(2545 *Borden*) February; (2515 *Meyer*) January; (1074 *Whitford*) January. In forests 140 to 200 m., widely distributed in the Philippines. Java to New Guinea and Australia.

11. HARPULLIA Roxb.

1. **H. arborea** (Blanco) Radlk. Sitzb. Math.-Phys. Akad. Muench. **20** (1890) 404.

(1302 *Whitford*) June; (1282, 1298, 1299 *Borden*) July; (6845 *Elmer*) November; (3166 *Merrill*) October. In thickets below 100 m., common and widely distributed in the Philippines. British India and Malaya. T., *Uas, Poas.*

SABIACEÆ.

1. MELIOSMA Blume.

1. **M.** sp.

(1352 *Borden*) July. On ridges at 750 m., with very young fruits only.

RHAMNALES.

RHAMNACEÆ.

1. ZIZYPHUS Juss.

1. **Z. trinervia** (Cav.) Poir.; Vidal, Rev. Pl. Vasc. Filip. (1886) 91.

(6108 *Leiberg*) July; (6750 *Elmer*) November; (2190 *Meyer*) December; (1075 *Whitford*) January; (1308 *Borden*) July; (74 *Barnes*) November; (3100 *Merrill*) October. Common in thickets below 100 m., widely distributed in the Philippines. Endemic. T., *Duclap.*

2. **Z. zonulatus** Blanco, Fl. Filip. ed. 2 (1845) 120. *Z. arborea* Merr. Govt. Lab. Publ. **6** (1904) 11.

(1394, 1399, 1535, 1548, 1557, 1576, 1960 *Borden*) July to October; (70, 192 *Barnes*) November, January. A tree in thickets and the lower forests, 75 to 200 m., widely distributed in the Philippines. Endemic. T., *Ligaa;* Pamp., *Balacat.*

2. COLUBRINA Brongn.

1. **C. asiatica** (Linn.) Brongn.; Laws. in Hook. f. Fl. Brit. Ind. **1** (1875) 642.

(1430 *Ahern's collector*) July, 1904. In thickets near the seashore. Tropical Asia, Africa, Malaya, and Australia. T., *Cabatete.*

VITACEÆ.

1. TETRASTIGMA Planch.

1. **T. lanceolarium** (Roxb.) Planch. in DC. Monog. Phan. **5** (1883–87) 423. *Vitis pedata* Blanco, Fl. Filip. ed. 1 (1837) 71, non Linn.

(16 *Whitford*) April; (2061 *Borden*) October; (3258 *Merrill*) October; (2310

Meyer) December. In thickets below 100 m., widely distributed in the Philippines. British India and Malaya. T., *Ayo.*

2. **T.** sp. (?)

(7004 *Elmer*) November; (71 *Barnes*) November. Specimens with fruit only.

2. CISSUS Linn.

1. **C. adnata** (Roxb.) Planch. l. c. 494.

(512 *Whitford*) July; (2519 *Merrill*) June. In thickets below 100 m. British India to southern China and Malaya.

2. **C. japonica** Willd.; Planch. l. c. 561.

(6672 *Elmer*) November; (2170 *Meyer*) December; (23 *Whitford*) April; (2535 *Merrill*) June. In thickets below 100 m. Japan to China, Java, New Caledonia, and Australia. T., *Calit-calit.*

3. **C. geniculata** Blume, Planch. l. c. 572.

(6700 *Elmer*) November; (1786 *Borden*) August; (2531 *Merrill*) June. In thickets below 100 m. Cochin China and Malaya.

4. **C. rostrata** (Miq.) Korth.; Planch. l. c. 500.

(6669 *Elmer*) November; (1927, 2122 *Borden*) October, November; (3793 *Merrill*) January; (1056 *Whitford*) January; (2193 *Meyer*) December. In thickets below 100 m. Java and New Guinea.

5. **C. repens** (Lam.) Planch. l. c. 504.

(3151 *Merrill*) October; (1785, 1795 *Borden*) August, September; (6708, 6751 *Elmer*) November. In thickets below 100 m., widely distributed in the Philippines. British India, Malaya, and Australia.

6. **C.** sp. (?)

(2495 *Borden*, 2510 *Meyer*) January. In thickets at 600 m., staminate flowers only. T., *Latgitic.*

3. LEEA Linn.

1. **L. manillensis** Walp. Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1**: 314.

(14 *Whitford*) April; (2552, 3163 *Merrill*) June, October; (2187 *Meyer*) December; (721 *Borden*) May. Along the river, and in thickets below 200 m., the whole inflorescence bright red, previously identified by the author and distributed as *L. rubra* Blume. Endemic. *Caliantang, Taliantang.*

2. **L. sambucina** Willd.; King, Mat. Fl. Malay. Penin. 700. 1896.

(3883 *Merrill*) August; (6651 *Elmer*) November. In forests at about 1,000 m. British India and Malaya.

3. **L. philippinensis** Merrill, sp. nov.

A shrub or small tree, sometimes 10 m. high, with glabrous pinnate leaves, lanceolate to oblong lanceolate, long acuminate leaflets, the flowers greenish white, yellowish, or sometimes tinged with pink. Branches light brown, lenticellate, not at all pubescent, terete. Leaves 20 to 50 cm. long, simply pinnate, the leaflets 5 to 13; rhachis glabrous, terete, the petiole channeled above; leaflets 8 to 20 cm. long, 2 to 6 cm. wide, glabrous, dull, subcoriaceous, the base acute, the apex long acuminate, the acumen blunt, the margins rather coarsely crenate-dentate; nerves 9 to 11 on each side of the midrib, usually not prominent; petiolules 1 cm. long, that of the terminal leaflet longer. Cymes up to 10 cm. long on stout peduncles 6 cm. long or less, the branches and especially the branchlets ferruginous pubescent or puberulent, often 20 cm. across, but frequently much smaller. Calyx green, glabrous, or when young puberulent, the buds obovoid, the teeth broad, short, acute. Petals oblong-ovate, acute, glabrous, about 4 mm. long, yellowish or greenish white, sometimes slightly pink. Staminal tube notched, about 5 mm. long. Fruits brown, glabrous, depressed globose, about 1.5 cm. thick, 1 cm. long, wrinkled when dry; seeds three, subglobose, about 6 mm. in diameter, glabrous, reticulate.

(28, 496, 1200 *Whitford*) March to July; (1192, 1232, 1326, 1740, 1922 *Borden*) June to September; (6686, 6693 *Elmer*) November; (6149 *Leiberg*) July; (1516 *Ahern's collector*, type) July; (2172, 2779 *Meyer*) December, February; (2507 *Merrill*) June; (149 *Barnes*) January. In thickets 25 to 75 m., extending along the river valley to an altitude of about 500 m. T., *Taliantang, Maguilic.*

A species apparently constantly with simply pinnate leaves, distinguished moreover from *Leea sambucina* by its obovoid buds and long acuminate leaflets, and from *L. javanica* and *L. æquata* by its glabrous leaves. The forms from the higher altitudes are constantly with smaller leaves and much smaller cymes than those from the lower regions.

MALVALES.

ELAEOCARPACEÆ.

1. ELAEOCARPUS Linn.

1. **E. monocera** Cav. Icon. **6** (1801) 1. *t. 501.*

(1574, 1804 *Borden*) August, September, 1904. In forests at about 130 m., apparently rare in the Philippines. King[1] retains as a distinct species, and apparently correctly so, *Elaeocarpus obtusus* Blume, the latter species having been reduced by Masters[2] to *E. monocera* Cav. Cavanilles' species is apparently distinct from Blume's and endemic.

2. **E. oblongus** Gaertn.; Mast. in Hook. f. Fl. Brit. Ind. **1** (1874) 403.

(3852 *Meyer*) March; (2937 *Borden*) March. In forests 200 to 500 m. British India and Malaya.

GONYSTYLACEÆ.

1. GONYSTYLUS T. et B.

1. **G. bancanus** (Miq.) Gilg.; Perk. Frag. Fl. Philip. (1904) 79.

(824 *Borden*) June. In forests at 600 m. Java, Sumatra, and Banca.

This specimen is sterile, but is manifestly identical with No. 1078 *Merrill*, so identified by Dr. Perkins.

TILIACEÆ.

1. CORCHORUS Linn.

1. **C. acutangulus** Lam.; Mast. in Hook. f. Fl. Brit. Ind. **1** (1874) 398.

(1912 *Borden*) September. In open places along the river in the lowlands, widely distributed in the Philippines. Generally distributed in the Tropics.

2. GREWIA Linn.

1. **G. multiflora** Juss.; Mast. l. c. 388.

(1920, 2050 *Borden*) September; (3144 *Merrill*) October; (6877 *Elmer*) November; (1502 *Ahern's collector*) August. In thickets below 100 m., common and widely distributed in the Philippines. Tropical Asia, Africa and Malaya. T., *Danglin.*

2. **G. stylocarpa** Warb. in Perk. Frag. Fl. Philip. (1904) 104.

(20, 105 *Whitford*) April; (2782 *Meyer*) February; (652, 676, 1194, 2564 *Borden*) April to February; (688 *Barnes*) March. In forests 100 to 600 m. Endemic. T., *Susumbiic.*

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[1] Journ. As. Soc. Beng. **60** (1891) **2:** 134, 135.

[2] Hook. f. Fl. Brit. Ind. **1** (1874) 405.

3. **G. tiliæfolia** Vahl.; Mast. l. c. 386.

(1288 *Whitford*) May; (1489 *Ahern's collector*) August; (3048 *Borden*) May. In thickets below 100 m. British India and tropical Africa.

4. **G. umbellata** Roxb.; Mast. l. c. 385.

(1483 *Ahern's collector*) August. In thickets near the seashore. British India and Malaya.

3. COLUMBIA Pers.

1. **C. serratifolia** (Cav.) DC. Prodr. **1** (1824) 512. *Colona serratifolia* Cav.; Merr. Govt. Lab. Publ. **6** (1904) 16.

(766, 1276, 1385 *Borden*) May, July; (1488 *Ahern's collector*) July; (382 *Whitford*) June. In thickets below 100 m., widely distributed in the Philippines. Celebes. T., *Anilao*.

4. TRIUMFETTA Linn.

1. **T. rhomboidea** Jacq.; Mast. l. c. 395.

(2182 *Meyer*) December; (6733 *Elmer*) November; (3294 *Merrill*) October. In open grass lands and waste places, widely distributed in the Philippines. Tropical Asia, Africa, and Malaya. T., *Calutan*.

MALVACEÆ.

1. ABUTILON Gaertn.

1. **A. indicum** (Linn.) G. Don.; Mast. in Hook. f. Fl. Brit. Ind. **1** (1874) 326.

(2038 *Borden*) October. Open places near the seashore, widely distributed in the Philippines. Tropics generally. Sp.-Fil., *Malbas*.

2. MALVASTRUM A. Gray.

1. **N. coromandelianum** (Willd.) Garcke, Bonplandia, **5** (1857) 297. *M. tricuspidatum* (Ait.) A. Gray; Mast. in Hook. f. Fl. Brit. Ind. **1** (1874) 321.

(1950 *Borden*) October. In open thickets near the seashore. Tropics generally.

3. SIDA Linn.

1. **S. cordifolia** Linn.; Mast. in Hook. f. Fl. Brit. Ind. **1** (1874) 324.

(1939 *Borden*) October. In thickets near the seashore, widely distributed in the Philippines. Tropics generally.

2. **S. carpinifolia** Linn.; Mast. l. c. 323.

(6776 *Elmer*) November. In open thickets and grass lands, widely distributed in the Philippines. Tropics generally.

3. **S. humilis** Willd.; Mast. l. c. 322.

(3304 *Merrill*) October. In open thickets. Tropics generally.

4. **S. mysorensis** W. et A.; Mast. l. c. 322.

(3272 *Merrill*) October; (1946 *Borden*) October. In open thickets and grass lands below 100 m. British India and Malaya.

4. **S. retusa** Linn.; DC. Prodr. **1** (1824) 462. *S. rhombifolia* var. *retusa* Mast., l. c. 324.

(1941 *Borden*) October; (6773 *Elmer*) November. In open dry grass lands, widely distributed in the Philippines. Tropics generally.

5. **S. rhombifolia** Linn.; Mast. l. c. 323.

(1945 *Borden*) October. In dry thickets, common and widely distributed. Tropics generally.

4. **MALACHRA** Linn.

1. **M. fasciata** Jacq. var. **peariloba** (Turcz.) Gürke in Engler's Bot. Jahrb. **16** (1893) 355.

(6722 *Elmer*) November; (2067 *Borden*) October; (3169 *Merrill*) October. In waste places and thickets about houses and along trails, common and widely distributed in the Philippines, certainly introduced from tropical America, and possibly not distinct from the species.

5. **URENA** Linn.

1. **U. lobata** Linn., var. **scabriuscula** Mast.; Hook. f. Fl. Brit. Ind. **1** (1874) 329.

(6774 *Elmer*) November; (3261 *Merrill*) October; (*Whitford*) April. In open grassy places below 100 m. British India.

2. **U. sinuata** Linn.; Mast. l. c.

(3271 *Merrill*) October; (6775 *Elmer*) November. In open grassy places, widely distributed in the Philippines. Tropics generally. T., *Calutcalutan.*

6. **HIBISCUS** Linn.

1. **H. schizopetalus** Hook. f. Bot. Mag. *t. 6524.*

(226 *Merrill*) Decades Phil. Forest. Fl., coll. *Borden,* October. Generally cultivated throughout the Philippines, not spontaneous. T., *Gomamela.*

2. **H. surattensis** Linn.; Mast. l. c. 334.

(1963 *Borden*) October; (6738 *Elmer*) November. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia, Africa, Malaya, and Australia. T., *Sagnit.*

3. **H. tiliaceus** Linn.; Mast. l. c. 343.

(134 *Merrill*) Decades Phil. Forest Fl., coll. *Ahern's collector,* July. Seashore, widely distributed in the Philippines. Tropics generally. T., *Malibago, Balibago.*

7. **ABELMOSCHUS** Medik.

1. **A. moschatus** Medik.; Miq. Fl. Ind. Bat. **1** (151) **2:** 1859. *Hibiscus abelmoschus* Linn.; Mast. l. c. 342.

(1820, 1902 *Borden*) September; (6739 *Elmer*) November. In thickets and open places below 100 m., widely distributed in the Philippines. Tropics generally, cultivated or wild. T., *Castuli.*

8. **THESPESIA** Corr.

1. **T. lampas** (Cav.) Dalz. et Gibs.; Mast. l. c. 345.

(2065, 2332 *Borden*) October, December; (2283 *Meyer*) December. In dry thickets below 100 m., widely distributed in the Philippines. Tropical Asia, Africa, and Malaya. T., *Bulacbulac.*

2. **T. populnea** (Linn.) Corr.; Mast. l. c. 345.

(2039 *Borden*) October; (2297 *Meyer*) January. In thickets along the seashore, widely distributed in the Philippines. Tropical Asia, Africa, Malaya, and Polynesia. T., *Banalo.*

BOMBACACEÆ.

1. **BOMBAX** Linn.

1. **B. ceiba** Linn. Sp. Pl. (1753) 511. *B. malabaricum* DC.; Mast. in Hook. f. Fl. Brit. Ind. **1** (1874) 349.

(1543, 1546, 1561, 2725 *Borden*) August, March, 1905; (332 *Barnes*) February. In forests and thickets below 130 m. British India and Malaya. T., *Malabulac.*

2. **CEIBA** Gaertn.

1. **C. pentandra** (Linn.) Gaertn. Fruct. **2** (1791) 244. *t. 133.* *Eriodendron anfractuosum* DC.; Mast. l. c. 350.

(416 *Whitford*) June. In thickets and old clearings below 100 m., widely distributed in the Philippines. Tropics generally, cultivated or wild. T., *Boboi.*

PAREITALES.

STERCULIACEÆ.

1. **MELOCHIA** Linn.

1. **M. indica** (Houtt.) A. Gray; Perk. Frag. Fl. Philip. (1904) 112. *M. velutina* Bedd.; Mast. in Hook. f. Fl. Brit. Ind. **1** (1874) 374. *M. arborea* Blanco.

(6874 *Elmer*) November. In thickets below 100 m., widely distributed in the Philippines. British India and Malaya. T., *Anibiong.*

2. **M. corchorifolia** Linn.; Mast. l. c. 374.

(1917 *Borden*) September. In thickets and open places below 100 m., widely distributed in the Philippines. Tropics generally.

2. **WALTHERIA** Linn.

1. **W. americana** Linn.; DC. Prodr. **1** (1824) 492. *W. indica* Linn.; Mast. l. c. 374.

(3269 *Merrill*) October. In thickets below 100 m., widely distributed in the Philippines. Tropics generally.

3. **COMMERSONIA** Forst.

1. **C. platyphylla** Andr.; Mast. l. c. 378.

(2227 *Meyer*) December; (6690 *Elmer*) November; (1457 *Ahern's collector*) July; (2471 *Borden*) January. In thickets below 100 m., widely distributed in the Philippines. Malaya. T., *Anabo.*

4. **ABROMA** Linn. f.

1. **A. augusta** Linn. f.; Mast. l. c. 375.

(2324 *Borden*) December. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya. T., *Anabo, Anabong.*

5. **PTEROSPERMUM** Schreb.

1. **P. niveum** Vid. Rev. Pl. Vasc. Filip. (1886) 67.

(1042 *Whitford*) December; (2470 *Borden*) January. In forests and thickets below 100 m., widely distributed in the Philippines. Endemic. T., *Bayog.*

2. **P. obliquum** Blanco Fl. Filip. ed. 1 (1837) 529.

(2257 *Meyer*) December; (1645, 2370 *Borden*) August, January; (1045 *Whitford*) December; (72 *Barnes*) November. In forests and thickets below 120 m. Endemic. T., *Bayog.*

6. **HELICTERES** Linn.

1. **H. hirsuta** Lour.; King in Journ. As. Soc. Beng. **60** (1891) **2:** 82. *H. spicata* Colebr.; Mast. l. c. 366.

(157 *Barnes*) January; (1602, 2018 *Borden*) August, October; (6648 *Elmer*) November; (95 *Whitford*) April; (3147 *Merrill*) October. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya.

7. KLEINHOFIA Linn.

1. **K. hospita** Linn.; Mast. l. c. 364.
(6726 *Elmer*) November; (2240 *Meyer*) December; (1384, 1623, 1797 *Borden*) July, September. In forests and thickets below 100 m., common and widely distributed in the Philippines. Tropical Asia, Africa, and Malaya. T., *Tanag.*

8. STERCULIA Linn.

1. **S. brevipetiolata** Merr. Govt. Lab. Publ. **35** (1906) 40.
(1907, 3028 *Borden*) September, May; (6829 *Elmer*) November; (1226 *Whitford*) April; (3023 *Meyer*) May; (6088 *Leiberg*) July; (200 *Barnes*) January. Forests 200 to 500 m. Endemic.
2. **S. crassiramea** Merr. l. c. 29 (1905) 28.
(1363 *Whitford*) September; (2258 *Meyer*) December. In forests at about 100 m. Endemic. T., *Malapapaya.*
3. **S. fœtida** Linn.; Mast. l. c. 354.
(2936 *Borden*) March; (2301 *Meyer*) December; (6991 *Elmer*) November. In thickets and open forests below 100 m., widely distributed in the Philippines. Tropical Asia, Africa, Malaya, and Australia. T., *Calumpang.*
4. **S. montana** Merr. l. c. **35** (1906) 40.
(1221 *Whitford*) April; (6761 *Elmer*) November. In forests on exposed ridges above 1,000 m. Endemic.
5. **S. oblongata** R. Br. Pl. Jav. Rar. 238.
(692, 1321 *Borden*) May, July. In forests at 150 m. Endemic.

9. PTEROCYMBIUM R. Br.

1. **P. tinctorium** (Blanco) Merr. Govt. Lab. Publ. **27** (1905) 24. *T. javanicum* R. Br. *Sterculia campanulata* Wall.
(744, 780, 1318, 2009 *Borden*) March to July. In forests and thickets below 200 m., widely distributed in the Philippines. Malayan Peninsula and Archipelago. T., *Taoto.*

10. HERITIERA Ait.

1. **H. litoralis** Dry.; Mast. l. c. 363.
(1268 *Whitford*) May; (2474 *Borden*) January. Along the seashore, widely distributed in the Philippines. Seacoasts of the Tropics of the Old World. T., *Dungon, Dungòn late.*

11. TARRIETIA Blume.

1. **T. sylvatica** (Vid.) Merr. Forest. Bureau Bull. **1** (1903) 38. *Heritiera sylvatica* Vidal, Rev. Pl. Vasc. Filip. (1886) 66.
(*Whitford*) June. In forests at 400 m. Endemic. T., *Dungon.*

DILLENIACEÆ.

1. TETRACERA Linn.

1. **T. sarmentosa** (Linn.) Vahl.; *Delima aspera* Linn.; Hook. f. et Th. Fl. Brit. Ind. **1** (1872) 31.
(1910 *Borden*) September; (2558 *Merrill*) June; (383 *Whitford*) June. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya. T., *Malacatmon.*

2. DILLENIA Linn.

1. **D. philippinensis** Rolfe Journ. Linn. Soc. Bot. **21** (1884) 307.

(1259 *Borden*) June. In forests at 200 m., widely distributed in the Philippines. Endemic. T., *Catmon*.

2. **D. luzoniensis** (Vidal). *Wormia luzoniensis* Vidal, Rev. Pl. Vasc. Filip. (1886) 36.

(1320 *Whitford*) June; (3063 *Borden*) May. In forests 140 to 400 m. Endemic.

3. SAURAUIA Willd.

1. **S. subglabra** Merr. Govt. Lab. Publ. **35** (1906) 43.

(268 *Whitford*) May; (2767 *Meyer*) February. In forests in river cañon at 800 m. Endemic.

THEACEÆ.

1. THEA Linn.

1. **T. montana** (Blanco) Merr. Govt. Lab. Publ. **27** (1905) 21; l. c. **35** (1906) 44.

(304, 441 *Whitford*) May, July; (2402, 2831 *Meyer*) January, March; (6787, 6977 *Elmer*) November; (1196, 1362, 1905, 2378 *Borden*) June to January. In forests above 500 m. Endemic.

2. TERNSTRŒMIA Nutt.

1. **T. toquian** (Blanco) F.-Vill. Nov. App. (1880) 18. *Taonabo toquian* Merr. Govt. Lab. Publ. **27** (1905) 21.

(137, 150, 208 *Barnes*) January; (3206 *Merrill*) October; (1506 *Ahern's collector*) July; (787, 835, 1351, 2381, 2935 *Borden*) May to March; (6899 *Elmer*) November; (2207, 2605, 2614, 2760 *Meyer*) December to February; (100. 337 *Whitford*) April, May. Abundant on forested ridges above 700 m. Endemic. T., *Bicag*.

3. ADINANDRA Jack.

1. **A. luzonica** Merr. Govt. Lab. Publ. **29** (1905) 29.

(6906 *Elmer*) November; (6057 *Leiberg*) July; (1360 *Borden*) July; (446. 1184 *Whitford*) July, March. Exposed ridges in the mossy forest at 1,200 m. Endemic.

4. EURYA Thunb.

1. **E. acuminata** DC., var. **euprista** Dyer in Hook. f. Fl. Brit. Ind. **1** (1872) 285.

(2621, 2641 *Meyer*) February; (1192 *Whitford*) March; (2119 *Borden*) November; (3712 *Merrill*) January; (1440 *Ahern's collector*) August; (6813 *Elmer*) November. On forested slopes and ridges in the mossy forest above 1,000 m. British India to Malaya and the Fiji Islands.

5. GORDONIA Ell.

1. **Gordonia fragrans** Merrill, sp. nov.

A tree 6 to 18 m. high. Branches brown or gray, glabrous. Leaves coriaceous, glabrous and shining on both surfaces, oblong lanceolate, 7 to 15 cm. long, 2 to 5 cm. wide, the margins obscurely, finely crenate, the apex obscurely blunt acuminate, the acumen retuse, the base acute; nerves obscure, scarcely more prominent than the lax reticulations; petioles stout, 5 mm. long or less. Flowers solitary, axillary, white, fragrant, about 5 cm. in diameter, subsessile or shortly pediceled. Bracts and calyx lobes rounded, pubescent. Petals 2 to 2.5 cm. long, about 1.5 cm. wide, rounded at the apex, densely appressed pubescent outside, slightly pubescent inside near the base, slightly united below. Stamens indefinite; filaments 7 to 8 mm. long, slightly united below and adnate to the corolla; anthers broadly ovate, 2 mm. long. Ovary oblong ovoid, glabrous or nearly so, 5-celled. Fruit oblong, woody, about 3 cm. long, appressed pubescent, the back of the lobes sulcate. Seeds, including the wing, 1.5 cm. long, the wing membranous, 5 mm. wide.

(305 *Whitford*) May; (2596 *Meyer*) February) (3732 *Merrill*) January; (809 *Borden*) May. In forests and on exposed ridges 600 to 1,100 m.

GUTTIFEREÆ.

1. CRATOXYLON Blume.

1. **C. blancoi** Blume Mus. Bot. Lugd. Bat. **2** (1856) 17.

(1478 *Ahern's collector*) August. In thickets below 100 m. Endemic. T., *Guyong-guyong.*

2. **C. floribundum** (Turcz.) F.-Vill. Nov. App. (1880) 16.

(1601, 2713, 3035 *Borden*) August, February, May; (27 *Whitford*) April; (3152 *Merrill*) October. In thickets below 100 m. Endemic. T., *Guyong-guyong.*

2. CALOPHYLLUM Linn.

1. **C. inophyllum** Linn.; Vesque in DC. Prodr. **8** (1893) 544.

(2472 *Borden*) January; (2303 *Meyer*) December; (139 *Merrill*) Decades Phil. Forest. Fl., coll. *Ahern's collector,* July. Along the seashore, common throughout the Philippines. Tropical shores of the Old World. Sp.-Fil., *Palomaria del playa, Palomaria.* T., *Dancalan.*

2. **Calophyllum whitfordii** Merrill, sp. nov.

A tree about 20 m. high. Branches light gray, aften yellowish, glabrous, shining, the ultimate branchlets often slightly angular, slender. Leaves opposite, ovate-oblong to elliptical oblong, glabrous, coriaceous, the base acute, the apex somewhat prominently acuminate, the acumen blunt, 6 to 8 cm. long, 2 to 4 cm. wide; petioles about 1 cm. long, rugose when dry, rather slender, channeled above. Panicles terminal, and in the upper axils, 5 cm. long or less, the peduncles about 2 cm. long, slightly ferruginous pubescent, the branches ascending, few flowered, the pedicels 6 to 10 mm. long, slender, rather densely ferruginous puberulous. Flowers white, fragrant, 1.5 cm. in diameter. Outer two sepals with few short hairs, especially near the margins, becoming glabrous or nearly so, 6 mm. long, 4 mm. wide, acute or obtuse, the inner two sepals petaloid, 9 mm. long, 6 mm. wide, rounded. Petals 4, elliptical or slightly obovate, 8 mm. long, about 5.5 mm. wide. Stamens very numerous, the filaments free, 4.5 to 5 mm. long; anthers about 1 mm. long. Ovary subglobose, glabrous; style slender, 5 mm. long. Fruit ovoid, glabrous, about 13 mm. long, 10 mm. in diameter, minutely apiculate, dark colored when dry.

(2613 *Meyer*) February; 1905 (type); (336 *Whitford*) May, 1904; (785 *Borden*) May, 1904. Forested slopes at about 700 m., recognized by its rather small, acuminate leaves. T., *Dataog.* Sp.-Fil., *Palomaria del monte.*

A very closely related if not identical form, is represented by the following specimens: (257, 1190 *Whitford*) May, 1904, March, 1905; (6907 *Elmer*) November, 1904; (1812 *Borden*) September, 1904; (142 *Merrill*) Decades Phil. Forest Fl. coll. *Ahern's collector,* July, 1904.

The above specimens, distributed as *C. pseudotacamahaca* Pl. et Tr., differ from *Calophyllum whitfordii* in their dark-colored branches and branchlets, smaller, decidedly narrower leaves and larger fruits, but as no flowers are at present available, the specimens being all with fruit, the material is here enumerated under the species above proposed.

3. **C. wallichianum** Pl. et Tr.; Vesque, l. c. 599.

(350, 495, 528, 554, 575 *Barnes*) November, March; (647, 2488 *Borden*) April, January; (21 *Whitford*) April. In forests 100 to 300 m. Malayan Peninsula. Sp.-Fil., *Palomaria del monte.*

3. KAYEA Wall.

1. **K. paniculata** (Blanco) Merr. Govt. Lab. Publ. **17** (1904) 29.

(2539 *Merrill*) June; (364 *Barnes*) March; (748, 1767, 2933 *Borden*) May, August, March; (6080 *Leiberg*) July; (68, 379 *Whitford*) April, June. In forests along the river 75 to 200 m. Endemic. T., *Carinas.*

4. GARCINIA Linn.

1. **G. binucao** (Blanco) Choisy; Vesque l. c. 454. *G. cumingiana* Pierre, Vesque l. c. 434.

(612, 713, 783 *Borden*) April, May; (170 *Merrill*) Decades Phil. Forest Fl., coll. *Borden*, April. In forests 100 to 200 m. Endemic. T., *Bilucao.*

2. **G. venulosa** (Blanco) Choisy; Vesque l. c. 408. (?)

(615, 712, 2494, 3062 *Borden*) April, *May*; (1240 *Whitford*) May; (2511 *Meyer*) January. In forests, 25 to 160 m. Endemic. T., *Tatlong anac.*

The above specimens agree in most of the characters assigned to this species by Blanco, but I am unable to determine at present whether or not material referred here by other authors is the same.

DIPTEROCARPACEÆ.

1. DIPTEROCARPUS Gaertn.

1. **D. grandiflorus** Blanco, Fl. Filip. ed. 2 (1847) 314; Brandis, Journ. Linn. Soc. Bot. **31** (1895) 37.

(2908 *Borden*) March; (186 *Barnes*) January; (*Whitford*) June. Abundant in the hill forests 100 to 300 m. Malaya. T., *Apitong.*

2. **D. vernicifluus** Blanco l. c.; Brandis l. c. 31. *Dipterocarpus velutinus* Vidal, Rev. Pl. Vasc. Filip. (1886) 59.

(358, 498, 501, 505, 524, 526, 537, 539, 552, 556, 561, 568, 577, 580, 592, 603, 609 *Barnes*) November to January; (309, 310 *Whitford*) May; (654, 655, 656, 664, 665, 666, 810, 1404, 1408, 1524, 1526, 1532, 1534, 1537, 1612, 1634, 1685, 1688, 2131, 2911 *Borden*) April to March. Abundant in the hill forests, ascending to 700 m. Endemic. T., *Panao.*

2. ANISOPTERA Korth.

1. **A. vidaliana** Brandis Journ. Linn. Soc. Bot. **31** (1895) 45.

(707, 743, 1317, 1322, 1377, 1381, 1390, 1407, 1409, 1527, 1616, 1623, 1633, 1635, 1637, 1638, 1641, 1643, 1647, 1649, 1657, 1658, 1667, 1675, 1691, 1788, 1789, 1792, 2128 *Borden*) May to September; (352, 1223 *Whitford*) June, April; (488, 593 *Barnes*) March, (3154 *Merrill*) October; (2256 *Meyer*) December; (1485 *Ahern's collector*) August. Abundant in forests near the river below 200 m. Endemic. T., *Mayapis.*

This species is apparently not sufficiently distinct from *A. thurifera* Blanco, abundant material showing intergradations between this species and *A. thurifera* Blanco and *A. calophylla* Perk.

3. **HOPEA** Roxb.

1. **A. acuminata** Merr. Govt. Lab. Publ. **29** (1905) 30.

(335 *Whitford*) May; (786, 825, 1175, 1245, 1592 *Borden*) May, August; (3864 *Merrill*) August. Forests 100 to 800 m. Endemic. T., *Dalindingan.*

4. **SHOREA** Roxb.

1. **S. contorta** Vidal, Sinopsis, Atlas (1883) 15 *t. 15. f. E.;* Rev. Pl. Vasc. Filip. (1886) 61; Brandis, l. c. 88.

(504, 511, 519, 536, 538, 534, 598, 605 *Barnes*) November, March; (293 *Whitford*) May; (72 *Merrill*) Decades Phil. Forest Fl., coll. *Barnes,* January; (650, 653, 677, 821, 1748 *Borden*) April, August. In forests 100 to 600 m. Endemic. T., *Lauan.*

2. **S. guiso** (Blanco) Blume; Brandis l. c. 89.

(659, 1179, 1398, 1525, 1530, 1533, 1559, 1572, 1799 *Borden*) April, September; (490, 491, 530, 508, 543, 545, 550, 553, 572, 576, 581 *Barnes*) November, March; (71 *Merrill*) Decades Phil. Forest Fl., coll. *Barnes,* January. In forest 100 to 300 m. Endemic. T., *Guiso, Guijo.*

3. **S. polysperma** (Blanco) Merr. Govt. Lab. Publ. **29** (1905) 29.

(734, 784, 819, 1248, 1410, 2130 *Borden*) May, September; (132 *Whitford*) May; (606 *Barnes*) January; (187 *Merrill*) Decades Phil. Forest Fl., coll. *Borden,* June. Forests 100 to 800 m. Endemic. T., *Tinguili.*

4. **S. furfuracea** Miq.; Brandis l. c. 98.

(*Meyer*) April. In forests at 800 m., sterile specimens but manifestly this species. Malayan Peninsula and Archipelago.

5. **VATICA** Linn.

1. **V. mangachapoi** Blanco; Brandis, l. c. 134.

(804, 815, 1593 *Borden*) May, August; (3896 *Merrill*) August; (306, 1224 *Whitford*) May, April. Forests 700 to 1,200 m. Endemic.

The above specimens certainly represent the species as interpreted by Vidal and accepted by Brandis, but as noted by Brandis, Blanco's description does not apply closely. The tree is apparently not well known to the natives of the region surrounding Mount Mariveles, as no native name was obtained. Specimens from the mountains back of Manila, identical with those cited above, bear the Tagalog names *Lisican* and *Dangui.*

BIXACEÆ.

1. **BIXA** Linn.

1. **B. orellana** Linn. Sp. Pl. (1753) 512.

(2247 *Meyer*) December. In deserted clearings, below 100 m., introduced from tropical America and now widely distributed in the Philippines. Sp.-Fil., *Achuete.*

FLACOURTIACEÆ.

1. **SCOLOPIA** Schreb.

1. **S. luzonensis** (Presl) Warb. in Engler und Prantl. Nat. Pflanzenfam. **3** (1893) **6:** 30. *f. 11.*

(1197, 1244 *Whitford*) March, May; (773 *Borden*) May. In thickets near the seashore and also on forested ridges at 800 m. Endemic.

A species doubtfully distinct from the widely distributed *Scolopia crenata* Clos.

2. **HOMALIUM** Jacq.

1. **H. luzoniense** F.-Vill. Nov. App. (1880–83) 94.

(2071 *Borden*) October. In thickets below 100 m. Endemic.

3. **FLACOURTIA** Juss.

1. **F. inermis** Roxb.; Hook. f. et Th. Fl. Brit. Ind. **1** (1872) 192.

(1744 *Borden*) August; (1252 *Whitford*) May. In forests at about 200 m. Malayan Peninsula and Archipelago.

4. **CASEARIA** Jacq.

1. **C. cinerea** Turcz. Bull. Soc. Nat. Mosc. **31** (1858) 462.

(1775 *Borden*) August; (2822 *Meyer*) March. In forests at 600 m. Endemic. (?)

Vidal retains this species as a distinct one, but Hooker f., and King reduce it to the widely distributed *Casearia grewiæfolia* Vent.

2. **C. fuliginosa** Blanco, Fl. Filip. ed. 2 (1845) 262.

(2300 *Meyer*) December; (2706 *Borden*) February. In thickets below 100 m. Endemic.

3. **C. solida** Merr. Govt. Lab. Publ. **35** (1906) 46.

(2499, 3722 *Merrill*) June, January; (626, 670, 1230, 1233, 3055 *Borden*) April, May; (192, 526, 1194 *Whitford*) July, May; (6791, 7006 *Elmer*) November; (2810 *Meyer*) March. Forests 100 to 800 m. Endemic.

4. **Casearia crenata** Merrill, sp. nov.

A shrub or small tree, 4 to 12 m. high. Branches slender, glabrous, often slightly glaucous, nearly black when dry. Leaves elliptical ovate, glabrous on both surfaces, submembranous, 7 to 12 cm. long, 4 to 6.5 cm. wide, the base acute, rarely subtruncate, inequilateral, the apex rather prominently acuminate, the acumen blunt, the margins crenate except near the base, the teeth small; nerves 7 to 9 on each side of the midrib, somewhat prominent beneath, the reticulations distinct; petioles slender, 1 to 1.5 cm. long. Flowers few, two to four in each axil, greenish white, the pedicels cinereous-puberulous, 2 to 3 mm. long. Calyx lobes 5, elliptical ovate, acute or obtuse, 3.5 to 4 mm. long, 2.5 to 3 mm. wide, slightly pubescent. Stamens 8; filaments 1.2 mm. long, glabrous; anthers ovate, 0.8 mm. long. Staminodes oblong, 1 mm. long, glabrous below, the apex and margins above lanate. Ovary narrowly ovoid, 2 mm. long, glabrous; style nearly obsolete; stigma capitate. Fruit yellow, glabrous, ellipsoid, about 2 cm. long, 3-valved. Seeds few, broadly ovoid, glabrous, acute, 4.5 mm. long, surrounded by a thin, pale, more or less lacerate aril.

(1150, 1210 *Whitford*) March, 1905; (1504 *Ahern's collector*) July, 1904. On exposed forested ridges in the mossy forest at 900 m.

5. **Casearia polyantha** Merrill, sp. nov.

A tree about 12 m. high, glabrous throughout. Branches slender, gray or grayish brown. Leaves oblong, subcoriaceous, glabrous, shining, 10 to 13 cm. long, 3.5 to 5.5 cm. wide, the base inequilateral, subtruncate or sometimes somewhat acute, the apex acute or somewhat acuminate, the margins rather finely crenate-dentate; nerves 10 to 12 on each side of the midrib, somewhat prominent beneath, the reticulations fine, distinct; petoles 1 to 1.7 cm. long. Flowers very numerous, crowded in the axils of the leaves, frequently 50 to 80 flowers in an axil, greenish white or yellowish, the pedicels slender minutely cinereous puberulent, 6 to 8 mm. long. Calyx lobes 5, oblong, acute, somewhat puberulent, 3 mm. long, 1.2 mm. wide. Stamens 8 to 10; filaments slender, glabrous, nearly 3 mm. long; anthers narrowly ovoid, 1 mm. long. Staminodes linear, 1.5 mm.

long, densely lanate. Ovary glabrous, narrowly ovoid; style 2 mm. long; stigma capitate. Fruit oblong-ovoid about 2 cm. long, 1 cm. thick when dry, yellow, glabrous, apiculate, 6 ribbed when dry, 3-valved. Seeds many, ovoid to oblong ovoid, 4 to 5 mm. long, somewhat compressed, acute, often minutely apiculate, glabrous, nearly or quite surrounded by the thin, pale, lacerate aril.

(3039 *Borden*) May, 1905; (138 *Merrill*) Decades Philip. Forest Fl., coll. *Borden*) July, distributed as *Casearia fuliginosa* Blanco. In forests at about 130 m., T., *Calauag.*

The type of the species is No. 3143 *Ahern's collector*, Antipolo, Province of Rizal, June, 1905.

PASSIFLORACEÆ.

1. **MODECCA** Lam.

1. **M. coccinea** Blanco, Fl. Filip. ed. 2 (1845) 453.

(7, 69, 1048 *Whitford*) April, January; (2927 *Borden*) March; (6782 *Elmer*) November. In forests 70 to 200 m.

The above specimens are all with fruits only, and accordingly I am unable definitely to determine at this time whether or not Blanco's species is valid, or whether it should be reduced to some Malayan or Asiatic form. The species is rather common and widely distributed in Luzon, in dry thickets and open forests. Following Engler, *Modecca* is a synonym of *Adenia*, but with the present doubt regarding the validity of Blanco's species, it is for the present retained in *Modecca* rather than to make a new combination.

2. **M. triloba** Blanco, l. c. 452 non (?) Roxb.

(1757, 2352 *Borden*) August, January. In forests at about 100 m. The remarks under the preceding species apply also to the present form.

CARICACEÆ.

1. **CARICA** Linn.

1. **C. papaya** Linn. Sp. Pl. (1753) 1056.

Occasionally cultivated about dwellings at Lamao, widely distributed in the Philippines. Introduced from tropical America. Sp.-Fil., *Papaya.*

DATISCACEÆ.

1. **OCTOMELES** Miq.

1. **O. sumatrana** Miq. Fl. Ind. Bat. Suppl. (1860) 336.

(2943 *Borden*) March. In forests at 130 m. Malaya and New Guinea. T., *Cabal.*

According to Warburg, the Philippine and Eastern Malayan form is a distinct species, *Octomeles moluccana* Warb., but this is reduced by Schumann and Lauterbach[1] to *O. sumatra* Miq.

BEGONIACEÆ.

1. **BEGONIA** Linn.

1. **B. rhombicarpa** A. DC. Ann. Sc. Nat. IV. **11** (1859) 129.

(204, 492, 499, 500, 1297, 1345 *Whitford*) July to September; (3124, 3862 *Merrill*) October, August; (6949, 6680 *Elmer*) November; (753 *Borden*) May. On damp banks in ravines, wet or dry cliffs, along streams, and on usually damp mossy cliffs on exposed ridges, 75 to 1,300 m. Endemic. T., *Pingol bato.*

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[1] Fl. Deutsch. Schutzgebiete Südsee (1901) 457.

Variable in vegetative characters, the form growing on dryer banks and cliffs with small leaves like the type (510 *Cuming*), the form in more shaded moist places with larger leaves approaching *Begonia merrillii* Warb., which is possibly not distinct from *B. rhombicarpa* A. DC.

2. **B.** sp.

(3734 *Merrill*) January. On damp cliffs, exposed ridges at 1,100 m. Vegetative characters of luxuriant forms of the preceding species but with very much larger fruits.

MYRTIFLORÆ.

THYMELIACEÆ.

1. PHALERIA Jack.

1. **P. cumingii** (Meissn.) F.-Vill. Nov. App. (1883) 183.

(1446 *Ahern's collector*) July; (3181 *Merrill*) October; (473, 1321 *Whitford*) July, June; (2219 *Meyer*) December, 1904. In thickets and forests 75 to 400 m. Endemic.

2. WICKSTRŒMIA Endl.

1. **W. lanceolata** Merr. Govt. Lab. Publ. **29** (1905) 31.

(1151 *Whitford*) March; (6901 *Elmer*) November. On exposed ridges in the mossy forest at 900 m. Endemic.

2. **W. meyeniana** Warb. in Perk. Frag. Fl. Philip. (1905) 171.

(6793 *Elmer*) November; (3892 *Merrill*) August; (2176 *Meyer*) December; (527 *Whitford*) July. In forests 75 to 200 m. Endemic.

3. **W. ovata** C. A. Mey.; Miessn. in DC. Prodr. **14** (1856) **1**: 544.

(3860 *Merrill*) August; (1588 *Borden*) August; (1340 *Whitford*) September. Exposed ridges in the mossy forest at 1,000 m. Endemic.

ELAEAGNACEÆ.

1. ELÆAGNUS Linn.

1. **E. latifolia** Linn.; Hook. f. Fl. Brit. Ind. **5** (1886) 202.

(2805 *Meyer*) March. In the mossy forest on exposed ridges at 1,300 m. British India to Southern China and Malaya.

LYTHRACEÆ.

1. LAGERSTRŒMIA Linn.

1. **L. speciosa** (Linn.) Pers. Syn. **2** (1807) 72. *L. flos-reginæ* Retz.; Clarke in Hook. f. Fl. Brit. Ind. **2** (1879) 577.

(755, 1269, 1283, 1389, 1538, 1553, 1615, 1622, 1679, 1680 *Borden*) May to August; (42, 356 *Whitford*) April, June; (6770 *Elmer*) November. In forests and thickets below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya. T., *Banaba.*

SONNERATIACEÆ.

1. SONNERATIA Linn. f.

1. **S. pagatpat** Blanco Fl. Filip. ed. 1 (1837) 424.

(1465 *Borden*) October; (1465 *Ahern's collector*) July. Along the rocky seashore, widely distributed in the Philippines. Malaya. T., *Pagatpat.*

2. CRYPTERONIA Blume.

1. **C. cumingii** Planch.; Niedenzu in Engler's Bot. Jahrb. **15** (1893) 178.

(327 *Barnes*) February; (1064 *Whitford*) January; (2585 *Meyer*) February; (2571 *Borden*) February. In forests 75 to 150 m. Endemic.

2. **C. paniculata** Blume; Niedenzu l. c. 175.

(65 *Merrill*) Decades Philippine Forest Fl. coll. *Barnes,* January. In forests at 300 m. British India and Malaya.

LECYTHIDACEÆ.

1. PLANCHONIA Blume.

1. **P. spectabilis** Merr. Govt. Lab. Publ. **17** (1904) 30.

(58, 590 *Barnes*) October, March; (363 *Whitford*) June; (756, 1395, 1571, 1644, 1666 *Borden*) July, August. In forests 100 to 600 m. Endemic. T., *Llamog.*

2. BARRINGTONIA Forst.

1. **B. reticulata** (Blume) Miq. Fl. Ind. Bat. **1** (1855) 490.

(71 *Whitford*) April; (6124 *Leiberg*) July. In thickets along streams below 100 m. Malaya. T., *Putat.*

2. **B. racemosa** (Linn.) Blume; Clarke in Hook. f. Fl. Brit. Ind. **3** (1879) 507.

(*Whitford*). In thickets near the seashore. British India to Malaya and Polynesia. T., *Putat.*

RHIZOPHORACEÆ.

1. GYNOTROCHES Blume.

1. **G. parvifolia** Merr. Govt. Lab. Publ. **35** (1906) 46.

(1173 *Whitford*) March. On exposed ridges in the mossy forest at about 1,000 m. Endemic.

2. CERIOPS Arn.

1. **C. roxburghiana** Arn.; Hook. f. Fl. Brit. Ind. **2** (1878) 436.

(1273, 1277 *Whitford*) May; (2313 *Meyer*) December; (2354 *Borden*) January. Tidal forests throughout the Philippines. Tropics of the Old World. T., *Bacauan.*

3. RHIZOPHORA Linn.

1. **R. conjugata** Lam.; Hook. f. l. c. 436.

(1432 *Ahern's collector*) August. Tidal forests throughout the Philippines. Tropics of the Old World. T., *Bacauan.*

4. CARALLIA Roxb.

1. **C. integerrima** DC.; Hook. f. l. c. 439.

(2578 *Meyer*) February; (1683, 2555, 2708 *Borden*) August, February; (6755 *Elmer*) November. In thickets below 100 m. British India to Southern China, Malaya and Australia.

5. BRUGUIERA Lam.

1. **B. gymnorrhiza** Lam.; Hook. f. l. c. 437.

(1494 *Ahern's collector*) August; (2273 Meyer) December; (7008 *Elmer*) November. Tidal forests throughout the Philippines. Tropics of the Old World. T., *Tagasa.*

6. PELLACALYX Korth.

1. **P. pustulata** Merr. Govt. Lab. Publ. **35** (1906) 47.

(1282 *Whitford*, 3040 *Borden*, 3019 *Meyer*) May. In forests 100 to 300 m. Endemic.

COMBRETACEÆ.

1. TERMINALIA Linn.

1. **T. catappa** Linn.; Clarke in Hook. f. Fl. Brit. Ind. **2** (1878) 444.

(2236 *Meyer*, 2125 *Borden*) December; (184 *Barnes*) January. Thickets near the seashore, widely distributed in the Philippines. Malaya, generally planted in most tropical countries. T., *Talisay.*

2. **T. edulis** Blanco Fl. Filip. ed. 2 (1845) 265.

(1387, 1652 *Borden*) July, August. In forests 85 to 150 m. Endemic. T., *Calumpit.*

3. **T. multiflora** Merr. Govt. Lab. Publ. **17** (1904) 34.

(6990 *Elmer*) November. In forests. Endemic.

4. **T. ovocarpa** Merr. l. c. 32.

(2249, 2579 *Meyer*) December, February; (347 *Whitford*) May; (1216, 2075 *Borden*) June, October; (67 *Barnes*) November. In forests 100 to 550 m. Endemic. T., *Talisay del monte.*

5. **T. nitens** Presl. Epim. Bot. (1849) 213.

(64 *Barnes*) November; (2241 *Meyer*) December; (1205, 1547, 1562, 1619, 1738 *Borden*) June, August; (393 *Whitford*) June. In forests 75 to 150 m. Endemic. T., *Sacat.*

2. COMBRETUM Linn.

1. **C. squamosum** Roxb.; Clarke in Hook. f. Fl. Brit. Ind. **2** (1878) 456.

(2173, 2304 *Meyer*) December; (2338, 2341 *Borden*) December; (6715 *Elmer*) November; (1032 *Whitford*) December. In thickets below 100 m. British India and Malaya.

3. QUISQUALIS Linn.

1. **Q. indica** Linn.; Clarke l. c. 459.

(1497 *Ahern's collector*) July; (39, 1287 *Whitford*) April, May. In thickets below 100 m., widely distributed in the Philippines. Malaya, generally cultivated in the Tropics. T., *Niogniogan.*

MYRTACEÆ.

1. PSIDIUM Linn.

1. **P. guajava** Linn.; Duthie in Hook. f. Fl. Brit. Ind. **2** (1878) 468.

(1323 *Borden*) July; (2196 *Meyer*) December; (6097 *Leiberg*) July; (6772 *Elmer*) November. Very abundant in thickets below 100 m., widely distributed in the Philippines. Introduced from tropical America. The Guava. Sp.-Fil., *Bayabas, Guayabas.*

2. DECASPERMUM Forst.

1. **D. blancoi** Vidal, Phan. Cuming. Philip. (1885) 173.

(3890 *Merrill*) August; (1331 *Borden*) July. Exposed ridges, mossy forest, at 1,000 m. Endemic.

2. **D. paniculatum** (Lindl.) Kurz.; Clarke l. c. 470.

(6992 *Elmer*) November; (455 *Whitford*) July; (1332, 1589 *Borden*) July, August; (3861 *Merrill*) August. With the preceding, widely distributed in the Philippines. Tropical Asia, Malaya and Australia.

3. EUGENIA Linn.

1. **E. acuminatissima** (Blume) Kurz.; Duthie in Hook. f. Fl. Brit. Ind. **2** (1878) 483. *E. cumingiana* Vidal, Phan. Cuming. Philip. (1885) 173, non *E. cumingii* Hook. et Arn. § *Syzygium.*

(811, 2385 *Borden*) June, January; (2406, 2628, 2801, 2807, 3004 *Meyer*) January, May; (1198, 1228 *Whitford*) March, April. In forests 600 to 1,000 m., widely distributed in the Philippines. Malayan Peninsula and Archipelago.

Vidal's name for this species is invalid, but at any rate the Philippine form referred by him to *Eugenia cumingiana* is apparently identical with *E. acuminatissima* Kurz. A cotype of Vidal's species (925 *Cuming*) is in our herbarium.

E. acuminatissima (Blume) Kurz, var. **parva** Merrill, var. nov.

Similar to the species but with much less acuminate reduced leaves 3 to 6 cm. long, 0.8 to 1.5 cm. wide.

(1136, 1218 *Whitford*) April, March; also No. 861 *Cuming*, Philippines, 1836–40, without locality. On exposed ridges in the mossy forests at about 1,000 m., apparently only a reduced form of the species due to habitat.

2. **Eugenia arcuatinervia** Merrill, sp. nov. § *Jambosa.*

A tree reaching a height of 20 m. Branches light gray or brownish, glabrous, terete. Leaves ovate lanceolate, glabrous, subcoriaceous, rather prominently acuminate, the acumen slender, blunt, base acute, 12 to 14 cm. long, 4.5 to 5.5 cm. wide; primary nerves about 10 on each side of the midrib, rather prominent beneath, spreading, anastomosing and forming an arched intramarginal nerve, 3 to 5 mm. from the margin of the leaf as prominent as the primary nerves, and a secondary marginal nerve as prominent as the lax reticulations; petioles 1.5 cm. long, channeled above, the lamina slightly narrowly decurrent. Inflorescence of narrow few flowered terminal and axillary racemose panicles 8 cm. long or less, the peduncles glabrous, often slightly angled, 3 to 5 cm. long. Flowers solitary or in pairs, white, fragrant, 1.5 cm. long including the stamens, the buds globose or obovoid. Calyx cup-shaped, narrowed to the 2 or 3 mm. long pedicel, obscurely 4-lobed, 5 to 6 mm. in diameter at the mouth. Petals 4, free, suborbicular-reniform, 4 mm. long, 4 to 6 mm. wide, glandular-punctate. Stamens indefinite; filaments 7 to 8 mm. long; anthers 0.6 mm. long.

(2598 *Meyer*) February, 1905. In forests at about 600 m.

3. **E. barnesii** comb. nov. *Jambosa barnesii* Merr. Govt. Lab. Publ. **17** (1904) 37. § *Jambosa.*

(140 *Barnes*) January; (2774 *Meyer*) February; (733, 1198, 1236 *Borden*) May, June; (251 *Whitford*) May. In forests 600 to 800 m. Endemic.

4. **E. bataanensis** comb. nov. *Jambosa bataanensis* Merr. l. c.

(2083, 2386 *Borden*) October, January; (6807 *Elmer*) November; (2407, 2765 *Meyer*) January, February; (177 *Barnes*) January; (3761 *Merrill*) January. In forests 800 to 1,000 m. Endemic.

5. **E. bordenii** Merr. Govt. Lab. Publ. **35** (1906) 47. § *Jambosa.*

(633, 644, 690, 691, 1206, 1208, 1630, 1736 *Borden*) April to August; (328, 492, 497, 540 *Barnes*) November, February; (362 *Whitford*) June. In forests 100 to 200 m. Endemic. T., *Malaruhat, Malaruhat maputi.*

6. **E. cinnamomea** Vid. (?) Phan. Cuming. Philip. (1885) 173. § *Jambosa.*

(344 *Whitford*) May; (1188 *Borden*) June; (2803 *Meyer*) March. Forests at 600 m. The above specimens being with fruit only, accurate identification is impossible at this time.

7. **Eugenia clavellata** Merrill, sp. nov. § *Jambosa.*

A tree 15 to 20 m. high. Branches slender, terete, grayish or light brown. Leaves elliptical ovate, the venation very dense, 4 to 8 cm. long, 2 to 4.5 cm. wide, short or somewhat caudate acuminate, the acumen blunt, the base acute, often slightly decurrent acuminate, rather pale when dry, shining, with numerous scattered small dark colored glands on the lower surface, the veins very numerous, obscure, obscurely anastomosing; petioles about 4 mm. long. Panicles terminal and in the upper axils, 3 to 7 cm. long, the branches spreading-ascending, the flowers umbellately disposed at the ends of the short branchlets. Buds clavate. Flowers slender, nearly 1 cm. long, sessile in umbellate fascicles of 2 to 3 or more flowers each, the calyx proper subglobose, 2 mm. long, 3 mm. in diameter, truncate or very obscurely 4-lobed, abruptly contracted below to the 6 mm. long pseudostalk, glabrous. Petals 4, pink or white, suborbicular, about 2 mm. in diameter, free. Stamens indefinite; filaments 2 to 2.5 mm. long, thickened below; anthers less than 0.5 mm. long.

(2747 *Borden*) March, 1905; (2821 *Meyer*) March, 1905. In forests 500 to 600 m.

8. **E. congesta** Merr. Govt. Lab. Publ. **35** (1906) 49. § *Syzygium.*

(150, 448 *Whitford*) May, July; (6896 *Elmer*) November. On exposed ridges in the mossy forest above 1,200 m. Endemic.

9. **Eugenia densinervia** Merrill, sp. nov. § *Syzygium.*

A tree reaching a height of 25 m. Branches glabrous, light brown or grayish, terete, the ultimate branchlets strongly 4-angled. Leaves oblong elliptical to obovate elliptical, the apex broad, rarely obscurely acute, usually more or less narrowed to the acute or cuneate base, coriaceous, glabrous, pale when dry, shining above, 11 to 18 cm. long, 5 to 8 cm. wide, the nerves numerous, close, not distinct, parallel, anastomosing and forming a faint intramarginal nerve, the lower surface with numerous scattered obscure glands; petioles stout, 1.5 to 2 cm. long. Inflorescence a terminal cymose panicle 7 cm. long or less, the rhachis and branches stout, somewhat angled, the latter often 5 cm. long, ascending, flower bearing above only, the ultimate branchlets short, stout, each with about 3 flowers. Flowers white, about 1 cm. long. Calyx funnel-shaped, sessile or nearly so, about 6 mm. long, glabrous, obscurely 4-lobed, subtended by 2 or 3 small bracteoles. Corolla calyptrately deciduous, the petals connivent into a circular calyptra 5 to 6 mm. in diameter. Stamens indefinite; filaments 5 to 6 mm. long; anthers nearly 1 mm. long. Staminal disc nearly 1 mm. thick. Fruit subglobose to ovoid, 1 to 1.5 cm. long, crowned by the calyx rim.

(1249 *Whitford*) May, 1905; (719, 813, 1178, 1815, 2921 *Borden*) May, 1904, to March, 1905. In forests 200 to 600 m.

10. **E. glaucicalyx** Merr. Govt. Lab. Publ. **35** (1906) 50. § *Syzygium.*

(3949 *Merrill*) March; (817, 826, 1250, 2748 *Borden*) June, March. In forests at about 600 m. Endemic.

11. **E. javanica** Lam. (?) Duthie l. c. 474. § *Jambosa.*

(193 *Barnes*) January. In forests at 350 m., material in poor condition for identification.

12. **E. jambolana** Lam.; Duthie l. c. 499. § *Syzygium.*

(*Whitford*). In thickets below 100 m., common wild and cultivated throughout the Philippines. Tropical Asia to Malaya and Australia. T., *Duhat, Lumboy.*

13. **E. leptantha** Wight; Duthie l. c. 484. § *Syzygium.*

(2646, 2806 *Meyer*) February, March; (803, 827 *Borden*) May, June; (294 *Whitford*) May. In forests 600 to 800 m. Widely distributed in British India, Malaya, and Australia. T., *Carra.*

14. **E. luzonensis** comb. nov. *Jambosa luzonensis* Merr. Govt. Lab. Publ. **17** (1904) 37. § *Jambosa.*

(83 *Barnes*) November; (107, 357 *Whitford*) April, June; (172 *Merrill*) Decades Phil. Forest Fl., coll. *Barnes,* April; (6681 *Elmer*) November; (619, 658, 1197 *Borden*) April, August. In forests along the river 100 to 200 m. Endemic. T., *Malaruhat, Malaruhat mapula.*

15. **E. marivelesensis** Merrill, sp. nov. § *Jambosa.*

A tree 10 to 15 m. high. Branches slender, terete, light brown, glabrous. Leaves elliptical ovate, abruptly acuminate, the base acute, subcoriaceous, shining above, somewhat paler beneath, 6 to 10 cm. long, 3 to 4.5 cm. wide, the venation very dense, the veins slender, very numerous, not prominent, parallel, anastomosing in a slender intramarginal nerve; petioles slender 6 to 10 mm. long. Panicles terminal and in the upper axils, 4 cm. long or less, rather densely flowered, the branches and branchlets short, striate, terete. Flowers including the stamens 2 cm. long white, fragrant, the buds obovoid, sessile or very shortly pedicelled. Calyx funnel shaped, 7 to 8 mm. long, 5 to 6 mm. in diameter at the mouth, with 4 rounded lobes. Petals 4, suborbicular, concave, distinct, about 5 mm. in diameter. Stamens indefinite; filaments 10 to 12 mm. long; anthers 0.7 mm. long.

(618, 1184, 1522, 2922 *Borden*) April, March; (2597 *Meyer*) February. In forests 100 to 600 m. T., *Malaruhat*. The flower buds have a faint taste similar to that of cloves.

16. **Eugenia perpallida** nom. nov. *Syzygium pallidum* Merr. Govt. Lab. Publ. **17** (1904) 38, non *Eugenia pallida* Berg. § *Syzygium.*

(3124 *Meyer*) May; (1209 *Whitford*) March. In forests at 700 m. Endemic. Distinguished from *E. acuminatissima* Kurz, not only by the very pale leaves, but also by the dense venation.

17. **Eugenia robertii** Merrill, sp. nov. § *Jambosa.*

A tree 8 to 15 m. high. Branches light gray or brownish, usually slender, terete, shining, glabrous. Leaves elliptical ovate to lanceolate ovate, subcoriaceous, glabrous, dull, 5 to 10 cm. long, 2.5 to 4.5 cm. wide, short, often abruptly blunt acuminate, the base acute; nerves 7 to 10 on each side of the midrib, ascending-spreading, not prominent, the secondary ones slightly more obscure than the primary, anastomosing and forming an intramarginal nerve, with a more obscure secondary submarginal nerve, the reticulations obscure; petioles 5 to 7 mm. long. Inflorescence racemose, terminal and in the upper axils, about 3 cm. long, each raceme 3 to 5 flowered. Flowers 2.5 cm. long including the stamens, 3 to 3.5 cm. in diameter in anthesis, the buds obovoid. Calyx funnel shaped, 1 to 1.5 cm. long, 4-lobed, the lobes broad, rounded. Petals 4, free, suborbicular, concave, 1.2 to 1.5 cm. in diameter. Stamens indefinite; filaments 1.5 to 1.8 cm. long; anthers 1.2 mm. long.

(2636, 2857 *Meyer*) February, March, 1905; (349, 1182, 1211 *Whitford*) May, 1904, March, 1905. In forests and on exposed ridges 500 to 1,100 m. The type is No. 2857 *Robert Meyer*, for whom the species is named.

18. **Eugenia similis** Merrill, sp. nov. § *Syzygium.*

A tree 15 m. high or less. Branches slender, light gray or brownish, the ultimate branches terete, glabrous, often nearly black when dry. Leaves elliptical ovate to oblong ovate, 9 to 11 cm. long, 4 to 6 cm. wide, subcoriaceous, shining above, the apex short blunt acuminate, the base acute or slightly decurrent acuminate; primary nerves about 14 on each side of the midrib, spreading, not prominent, the secondary ones nearly as distinct, anastomosing, the reticulations fine; petioles slender, 2 to 2.5 cm. long. Panicles from the branches below the leaves, about 6 cm. long, the primary branches distant, horizontal, 2 cm. long or less, the flowers in threes at the apices of the branchlets. Buds obovoid. Flowers including the stamens 5 to 7 mm. long. Calyx funnel shaped, about 3 mm. long, 4-lobed, the lobes broadly triangular, acute, 1.5 to 2 mm. long. Petals connate, calyptrately deciduous, the calyptra about 4 mm. in diameter. Stamens indefinite; filaments 5 to 6 mm. long; anthers 0.4 mm. long.

(413 *Whitford*) June. In thickets along the river at about 40 m. T., *Malaruhat maputi.*

In leaf characters and inflorescence resembling *Eugenia luzonensis,* but belonging in a different section of the genus. Other specimens from various parts of Luzon apparently referable here: (1471 *Ahern's collector;* 2994, 2940, 3007 *Merrill;* 851 *Maule.*)

19. **E. whitfordii** Merr. Govt. Lab. Publ. **35** (1906) 49. § *Jambosa.*

(468 *Whitford*) July; (1182 *Borden*) June. In forests at 600 m. Endemic.

20. **E.** sp. § *Jambosa.*

(1227 *Whitford*) April. In forests at 500 m., fruiting specimen only.

21. **E.** sp. § *Jambosa.* (?)

(2781 *Meyer*) February. In forests at 600 m., young buds only.

4. TRISTANIA R. Br.

1. **T. decorticata** Merr. Govt. Lab. Publ. **35** (1906) 51.

(1324 *Whitford*) May. On exposed ridges in the mossy forest 800 to 900 m. Endemic. The above specimen differs from the type of the species in its somewhat pubescent inflorescence.

5. LEPTOSPERMUM Forst.

1. **L. amboinense** Blume; Duthie in Hook. f. Fl. Brit. Ind. **2** (1878) 464.

(788, 2118 *Borden*) May, November; (3246 *Merrill*) October; (123 *Whitford*) May; (285 *Copeland*) January. On exposed ridges in the mossy forest from 1,000 m. to the summit of the mountain, and on most of the higher mountains of the Philippines. Malaya and Australia.

Leptospermum annæ Stein, described from specimens from Mount Apo, Mindanao, is represented in our herbarium by several numbers from the type locality and is apparently not distinct from the species here considered to represent typical *L. amboinense.*

MELASTOMATACEÆ.

1. MELASTOMA Burm.

1. **M. fusca** Merr. Govt. Lab. Publ. **17** (1904) 39.

(204, 340 *Barnes*) January, February; (38, 106 *Whitford*) April; (1962, 2709 *Borden*) October, February; (6634 *Elmer*) November; (2180, 2609 *Meyer*) December, February; (298 *Copeland*) January. In forests 100 to 800 m. Endemic.

2. **M. polyanthum** Blume; Cogn. in DC. Monog. Phan. **7** (354) 1891.

(6818 *Elmer*) November; (2100 *Borden*) November; (6037 *Leiberg*) July. Forests 700 to 900 m. British India to Malaya and Australia.

2. MEDINILLA Gaud.

1. **M. amplifolia** Merr. Govt. Lab. Publ. **29** (1905) 37.

(1338 *Borden*) July. On exposed ridges in the mossy forests at 1,000 m. Endemic.

2. **M. astronioides** Triana; Merrill, l. c.

(206 *Whitford*) May; (3007 *Meyer*) May; (3895 *Merrill*) August. In forests along streams 100 to 800 m. Endemic.

3. **M. coriacea** Merr. l. c. 35.

(3121 *Meyer*) May; (228, 1159 *Whitford*) May, March. On exposed ridges in the mossy forest 900 to 1,000 m. Endemic.

4. **M. intermedia** Blume; Merr. l. c. 37.

(125 *Whitford*) May; (2405 *Meyer*) January; (3965 *Merrill*) March. In the mossy forests 900 to 1,000. Java.

5. **M. megacalyx** Merr. l. c. 36.

(1514 *Ahern's collector*) July. In forests. Endemic.

6. **M. ramiflora** Merr. l. c. 35.

(2208, 2758 *Meyer*) December, February; (1590 *Borden*) August; (3222 *Merrill*) October; (6036 *Leiberg*) July; (6803 *Elmer*) November; (267 *Copeland*) January; (148 *Whitford*) May. On exposed ridges in the mossy forest 900 to 1,300 m. Endemic.

3. **ASTRONIA** Blume.

1. **A. candolleana** Cogn. in DC. Monog. Phan. **7** (1891) 1099.

(750 *Borden*) May. In forests along the river below 100 m. Endemic.

2. **A. cumingiana** Vid.; Cogn. l. c. 1098.

(2757 *Meyer*) February; (6827 *Elmer*) November. On exposed ridges in the mossy forest at about 1,200 m. Endemic.

3. **A. meyeri** Merr. Govt. Lab. Publ. **35** (1906) 51.

(2840 *Meyer*) March. In forests, ravines at 1,050 m. Endemic.

4. **A. rolfei** Vid.; Cogn. l. c. 1095.

(238 *Whitford*) May; (2610 *Meyer*) February; (6056 *Leiberg*) July. In forests 550 to 900 m. Endemic.

4. **MEMECYLON** Linn.

1. **M. affine** Merr. Govt. Lab. Publ. **35** (1906) 52.

(454 *Whitford*) July; (6059 *Leiberg*) July; (3184, 3190 *Merrill*) October; (1336 *Borden*) July. In forests on exposed ridges at about 1,000 m. Endemic.

2. **M. edule** Roxb. var. **ovata** Clarke; Cogn. l. c. 1056.

(2495, 2563, 3788 *Merrill*) June, January; (82, 206 *Barnes*) November, January; (2191 *Meyer*) May; (730, 820, 1185, 1304, 1781 *Borden*) May, August; (83, 299, 1022 *Whitford*) April, December; (6723, 6796 *Elmer*) November; (6163 *Leiberg*) July. Abundant in thickets and forests 10 to 600 m., widely distributed in the Philippines. British India and Malaya. T., *Colis*.

3. **M. preslianum** Triana; Cogn. l. c. 1139.

(*Whitford*). In thickets below 100 m. Endemic.

ŒNOTHERACEÆ.

1. **JUSSIEUA** Linn.

1. **J. suffruticosa** Linn. Clarke in Hook. f. Fl. Brit. Ind. **2** (1879) 587.

(1942, 1956 *Borden*) October. In thickets and waste places below 100 m., widely distributed in the Philippines. Tropics generally.

2. **LUDWIGIA** Linn.

1. **L. prostrata** Roxb.; Clarke l. c. 588.

(1957 *Borden*) October. In thickets and open places below 100 m. Tropical Asia and Africa.

UMBELLIFLORÆ.

ARALIACEÆ.

1. **ARALIA** Linn.

1. **A.** sp.

(*Whitford*). In forests, sterile specimen only, resembling *Aralia hypoleuca* Presl., but the leaf rhachis, pinnæ, and leaflets with numerous short and long spines.

2. ARTHROPHYLLUM Blume.

1. **Arthrophyllum ahernianum** Merrill, sp. nov.

A tree about 12 m. high, with very long pinnate leaves, the leaflets oblong to oblong lanceolate, short acuminate, glabrous. Leaves up to 1 m. in length, the upper ones much smaller, the lower ones with 30 or more leaflets, the upper ones with 5 or 6 leaflets, the rhachis jointed, glabrous; leaflets 10 to 18 cm. long, 2.5 to 5 cm. wide, membranous, pale when dry, entire, the base rather abruptly acute, usually strongly inequilateral, the apex short acuminate, the acumen blunt or sharp; primary nerves about 6 on each side of the midrib, arched ascending, somewhat prominent, the secondary nerves and reticulations distinct beneath, lax; petiolules 5 to 10 mm. long. Umbels subtended by 3 or 4 elliptical ovate leaves nearly as long as the umbellules, each umbel consisting of 8 to 10 umbellules, glabrous or deciduously ferruginous pubescent; umbellules 10 to 15 flowered, the peduncles 4 to 5 cm. long, the pedicels 1 cm. long or less. Calyx about 3 mm. long, truncate. Petals 5, oblong ovate, acute, 4 mm. long, about 2 mm. wide, free. Stamens 5; filaments 5 mm. long; anthers curved, about 2 mm. long. Ovary 1-celled, 1-ovuled; style O. Fruit unknown.

(2780 *Meyer*) February; (*Whitford*). In dense forests on steep slopes at about 600 m., differing from *Arthrophyllum pinnatum* Clarke, to which it is apparently related, in its much longer leaves and larger more numerous leaflets which are not caudate acuminate.

3. SCHEFFLERA Forst.

1. **S. blancoi** nom. nov. *Nauclea digitata* Blanco, Fl. Filip. ed. 2 (1845) 102; ed. 3, 1 (1877) 188, non *Schefflera digitata* Forst. *Heptapleurum cephalotes* F.-Vill. Nov. App. (1883) 102, non Clarke. § *Cephaloschefflera.*

(3847 *Merrill*) August; (2834 *Meyer*) March. On forested slopes in ravines and on exposed ridges in the mossy forest 900 to 1,000 m. Endemic.

2. **Schefflera acuminatissima** Merrill, sp. nov.

Scandent on trees, reaching a height of 15 m. Branches gray or brownish, glabrous, striate, the ultimate branchlets often with few scattered stellate hairs. Leaves digitately 7 to 10 foliolate, alternate, the common petiole glabrous, 11 to 17 cm. long; leaflets narrowly oblong lanceolate or oblanceolate, glabrous submembranous, slightly shining above, the apex prominently slender caudate acuminate, often abruptly so, the base acute or slightly rounded, the margins entire, 8 to 15 cm. long, 2 to 4 cm. wide, for most part widest in the upper portion; primary nerves 15 or more on each side of the midrib, scarcely more prominent than the secondary nerves and reticulations, anastomosing; petioles slender, glabrous, 2 to 3.5 cm. long. Panicles terminal, each with 4 or 5 ascending branches 15 cm. long or less, the rhachis and branches more or less covered with weak, pale, somewhat stellately disposed hairs, the primary branches bearing numerous racemosely disposed slender, usually spreading 1 cm. long branchlets, each subtended by a deciduous, membranous, ovate or ovate lanceolate, acuminate bract about 1 cm. long, the flowers umbellately disposed at the tips of the branchlets, about 10 flowers in each umbel, their pedicels 1.5 to 2 mm. long. Calyx funnel shaped, truncate, 2 mm. long. Petals 5, greenish, narrowly ovate, acute, glabrous, 2 mm. long, 1.2 mm. wide, slightly united at their tips, separating from the base and falling as a whole. Stamens 5; filaments slender, 5 mm. long; anthers 1 mm. in diamener. Ovary 5-celled. Fruit yellow, ovoid to elliptical ovoid, 4 to 5 mm. long, 5-celled, 5-ridged, truncate, crowned by the flattened styles.

(172, 1222 *Whitford*) May, 1904 and 1905; (3005 *Meyer*) May, 1905. Scandent on trees in forests at about 700 m., the stems reaching a diameter of 5 cm. or more. Quite distinct from *Heptapleurum caudatum* Vidal.

3. **S. venulosa** (W. et A.) Harms. *Heptapleurum venulosum* Seem.; Clarke in Hook. f. Fl. Brit. Ind. **2** (1879) 729.

(3, 62 *Whitford*) April. In thickets along the river below 100 m. British India, Malaya, and Australia. T., *Galamai amo.*

In the identification of this species I have followed the earlier works of Vidal and F.-Villar, but the specimens here referred to *Schefflera venulosa* Harms, do not agree well with the description of that spcies and it is possible that it will be necessary to adopt one of Blanco's names for the Philippine form, there being available, *Polyscias odorata* Blanco=*Paratropia crassa* Blanco, and *Polyscias obtusa* Blanco=*Paratropia obtusa* Blanco, of the above, the description of the latter applying more closely to the form here referred to *Schefflera venulosa.*

4. **Schefflera bordeni** Merrill, sp. nov. § *Euschefflera, Heptapleurum.*

A tree (?) quite glabrous throughout with long petioled 7 to 8-foliolate leaves and terminal pinnately branched panicles nearly equaling the leaves. Branches light gray, rugose, the leaf scars prominent, the branchlets 5 mm. thick or less. Petioles 5 to 10 cm. long; leaflets elliptical lanceolate to elliptical or oblong oblanceolate or obovate, coriaceous, shining, 5 to 9 cm. long, 1.5 to 3 cm. wide, narrowed to the acute base, the apex gradually short or rather long acuminate, the acumen blunt; nerves 5 to 6 on each side of the midrib, ascending, not prominent, the reticulations obscure; petiolules 2 to 3.5 cm. long. Panicles about 15 cm. long, nearly as broad, the branches alternate, 6 to 8 cm. long, spreading, the upper ones somewhat shorter, the common rhachis about 10 cm. long, the branchlets racemosely disposed 8 mm. long or less, each bearing 4 to 6 umbellately disposed flowers, the pedicels 2 to 4 mm. long. Calyx about 1.5 mm. long, truncate. Petals 5, oblong ovate, acute, adherent by their apices and falling as a whole. Stamens 5; filaments 2.5 mm. long; anthers broadly elliptical ovate, 1 mm. long. Ovary 5-celled; style O. Fruit unknown.

(1350 *Borden*) July, 1904. In forests at about 800 m., according to the collector, a tree about 12 m. high.

3. POLYSCIAS Forst.

1. **P. nodosa** (DC.) Seem. Journ. Bot. **3** (1865) 181.

(89 *Whitford*) April; (2306 *Meyer*) December; (2711 *Borden*) February; (363, 585 *Barnes*) March; (293 *Merrill*) Decades Phil. Forest Fl., coll. *Borden*, March. In thickets and forests below 100 m., widely distributed in the Philippines. Malaya. T., *Tocudlangit.*

UMBELLIFERÆ.

1. HYDROCOTYLE Linn.

1. **H. rotundifolia** Roxb.; Clarke in Hook. f. Fl. Brit. Ind. **2** (1879) 668.

(265 *Whitford*) May. On damp rocks and cliffs in forests at 800 m. British India and Malaya to New Guinea.

2. CENTELLA Linn.

1. **C. asiatica** (Linn.) Urb. *Hydrocotyle asiatica* Linn.; Clarke l. c. 669.

(2302 *Merrill*) October. In dry thickets below 100 m., widely distributed in the Philippines. Tropical and subtropical regions.

CORNACEÆ.

1. ALANGIUM Lam.

1. **A. meyeri** Merr. Govt. Lab. Publ. **35** (1906) 54.

(2284 *Meyer*) December; (2334, 2569, 2728 *Borden*) December, February, March. In forests and thickets 50 to 100 m. Endemic.

2. MASTIXIA Blume.

1. **M. pentandra** Blume; Koord. & Valeton, Bijd. Boomsoort. Java **5** (1900) 89.

(208, 222, 1195 *Whitford*) May, March; (2201, 2773 *Meyer*) December, February; (755, 1355, 2108 *Borden*) May, July, November; (3740 *Merrill*) January; (151, 207 *Barnes*) January. Abundant in forests above 700 m. Java.

All the above specimens are with fruit only, except No. 1195 *Whitford*, which has very young flowers, and agree closely with the long description given by Koorders and Valeton, and are accordingly referred to Blume's species. No representative of the genus has previously been found in the Philippines.

METACHLAMYDEÆ (SYMPETALÆ).

ERICALES.

CLETHRACEÆ.

1. CLETHRA Linn.

1. **C. lancifolia** Turcz. Bull. Soc. Nat. Mosc. **36** (1863) **2:** 231.

(3226 *Merrill*) October; (794, 2095 *Borden*) May, November; (6994 *Elmer*) November; (1344 *Whitford*) September. On exposed ridges in the mossy forest at about 1,300 m. Endemic.

This species has erroneously been referred to *Clethra canescens* Reinw, by various authors, and in Index Kewensis is erroneously localized as Singapore.

ERICACEÆ.

1. RHODODENDRON Planch.

1. **R. quadrasianum** Vidal; Merr. Govt. Lab. Publ. **29** (1905) 43.

(6765 *Elmer*) November; (2090 *Borden*) November; (278, 1104 *Whitford*) May, February; (3215 *Merrill*) October; (6032 *Leiberg*) July. On exposed ridges in the mossy forest near the summit of the mountain. Endemic.

2. **R. schadenbergii** Warb.; Merr. l. c. 40.

(790, 2117 *Borden*) May, November; (6856 *Elmer*) November; (450 *Whitford*) July; (3255 *Merrill*) October; (6033 *Leiberg*) July. In forests on exposed ridges near the summit. Endemic.

3. **R. vidalii** Rolfe; Merr. l. c. 43.

(452 *Whitford*) July; (1591 *Borden*) August; (3743 *Merrill*) January; (300 *Merrill*) Decades Philip. Forest Fl., August. With the preceding. Endemic.

4. **R. xanthopetalum** Merr. l. c. 41.

(332 *Whitford*) May. Epiphytic in the mossy forest at 1,200 m. Endemic.

2. VACCINIUM Linn.

1. **V. cumingianum** Vidal, Rev. Pl. Vasc. Filip. (1886) 167.

(281 *Merrill*) Decades Philip. Forest Fl., March; (245, 459 *Whitford*) May, July; (1330, 1585 *Borden*) July, August; (2649 *Meyer*) February. Mossy forests on exposed ridges above 1,000 m. Endemic.

2. **V. jagori** Warb. in Perk. Frag. Fl. Philip. (1905) 174.

(282 *Merrill*) Decades Philippine Forest Fl., March, distributed as *V. subsessile* Merr.; (2623 *Meyer*) February; (145, 1101 *Whitford*) May, February; (7026 *Elmer*) November. With the preceding.. Endemic.

PRIMULALES.

MYRSINACEÆ.

1. MAESA Forsk.

1. **M. cumingii** Mez. in Engler's Pflanzenreich **9** (1902) 49.

(2518, 3711 *Merrill*) June, January; (486 *Whitford*) July; (6084 *Leiberg*) July; (2257 *Meyer*) December. In forests and thickets 50 to 900 m. Endemic.

2. **M. denticulata** Mez. l. c. 48.

(2761 *Meyer*) February; (1128 *Whitford*) March. In forests 800 to 1,100 m. Endemic.

3. **M. hænkeana** Mez. l. c. 32.

(205 *Barnes*) January; (1258, 1931, 2390 *Borden*) June, January; (11, 190, 1059 *Whitford*) April, January; (2508 *Meyer*) January; (7036 *Elmer*) November; (2528 *Merrill*) June. In forests and thickets 20 to 350 m. Endemic.

2. AEGICERAS Gaertn.

1. **A. corniculatum** (Linn.) Blanco; Mez. l. c. 55.

(2314 *Meyer*) December; (2355, 2717 *Borden*) January, February; (136 *Merrill*) Decades Philip. Forest Fl., coll. *Ahern's collector*, July. Strand forests, widely distributed in the Philippines. Seashores of tropical Asia, Malaya, and Australia.

3. ARDISIA Swartz.

1. **A. boissieri** A. DC.; Mez. l. c. 129.

(2594, 2776 *Meyer*) February; (1228, 1252, 1906 *Borden*) June, September; (148 *Barnes*) January; (284 *Copeland*) January; (102 *Whitford*) April; (6636 *Elmer*) November. In forests 500 to 900 m., a tree reaching a height of 12 m. Endemic.

Strongly resembling the widely distributed *Ardisia humilis* Vahl, but the latter as it is found in the Philippines usually grows near the seashore and is a shrub 1 to 4 or 5 m. high.

2. **A. marginata** Blume; Mez. l. c. 108.

(135 *Barnes*) January; (3237 *Meyer*) June; (1080, 1310 *Whitford*) February, June. In forests 700 to 800 m. Java.

3. **A. philippinensis** A. DC.; Mez. l. c. 100.

(2853 *Meyer*) March. In forests at 600 m. Endemic.

4. **A. saligna** Mez. l. c. 143.

(3867 *Merrill*) August; (6048 *Leiberg*) July. On exposed ridges in the mossy forest at 1,000 m. Endemic.

5. **A.** sp.

(3726 *Merrill*) January. Exposed ridges at 1,100 m., fruiting specimen only.

4. **DISCOCALYX** Mez.

1. **D. cybianthoides** (A. DC.) Mez. l. c. 213.

(3745 *Merrill*) January; (2416, 2816 *Meyer*) January, March; (213 *Whitford*) May; (139, 341 *Barnes*) January, February; (6836 *Elmer*) November; (1348, 2085, 2392, 2467 *Borden*) July to January. In forests and on ridges 400 to 1,000 m. Endemic.

2. **D.** sp. (?)

(3881 *Merrill*) August. In forests, ravines at 800 m., material very imperfect.

5. **EMBELIA** Burm.

1. **E. bataanensis** Merr. Govt. Lab. Publ. **29** (1905) 44.

(2832 *Meyer*) March; (3207 *Merrill*) October; (1114 *Whitford*) February; (1349 *Borden*) July; (6893 *Elmer*) November. In the mossy forest, exposed ridges, 600 to 1,000 m. Endemic.

2. **Embelia whitfordii** Merrill, sp. nov. § *Euembelia*.

A scandent shrub, glabrous except the inflorescence. Branches dark brown or nearly black when dry. Leaves coriaceous, elliptical ovate, narrowed at both ends, the base acute, the apex blunt, 7 to 9 cm. long, 2.5 to 4 cm. wide, slightly shining on both surfaces, entire, glabrous; nerves numerous, not prominent, the primary scarcely more prominent than the secondary ones and the reticulations; petioles about 1 cm. long. Panicles terminal, pyramidal, 12 to 15 cm. long, 6 to 8 cm. in diameter, many flowered, the primary branches spreading-ascending, the lower ones often 7 cm. long, the upper gradually shorter, the rhachis, branches, and branchlets minutely but densely ferruginous or cinereous puberulent, the rhachis becoming nearly glabrous. Flowers 1.5 to 1.7 mm. long, their pedicels 0.8 mm. long or less, papillose-puberulent, about as long as the narrowly ovate, acute, more or less puberulent bracteole, the margins of the bracteoles minutely papillose ciliate. Calyx 5-parted, the glandular punctate lobes narrowly ovate, acute 0.3 to 0.4 mm. long, minutely puberulent outside but the margins glabrous. Petals 5, free, ovate-lanceolate, acute, punctate with few large glands, 1.5 to 1.7 mm. long, 0.8 mm. wide. Stamens 5; filaments 0.8 mm. long; anthers 0.3 mm. long. Fruit subglobose, glabrous, about 2 mm. in diameter with numerous prominent glands, tipped with the persistent style.

(453, 1038 *Whitford*) July, June. On exposed ridges in the mossy forest at about 1,000 m.

6. **RAPANEA** Aubl.

1. **R. philippinensis** (A. DC.) Mez l. c. 364.

(3954 *Merrill*) March; (3114 *Meyer*) May. On exposed ridges in the mossy forest 1,000 to 1,200 m. Endemic.

EBENALES.

SAPOTACEÆ.

1. **ILLIPE** Kœnig.

1. **I. ramiflora** Merr. Govt. Lab. Publ. **17** (1904) 42.

(189, 583 *Barnes*) January, March. In forests at about 100 m. Endemic. T., *Baniti*.

2. PALAQUIUM Blanco.

1. **P. bataanense** Merr. Govt. Lab. Publ. **17** (1904) 44.

(156, 169 *Barnes*) January. In forests at about 100 m. Endemic.

2. **P. latifolium** Blanco; Merr. l. c. **6** (1904) 14.

(3785 *Merrill*) January; (131 *Barnes*) January; (63 *Merrill*) Decades Philip. Forest Fl., coll. *Barnes*, January. In forests at 100 m. Endemic.

3. **P. luzoniense** (F.-Vill.) Vid.; Merr. l. c. 15.

(155, 162, 179, 181, 486, 506 *Barnes*) November, January; (696, 698, 1671, 1739, 1918, 2325 *Borden*) May to December; (1016, 1026 *Whitford*) December; (2254, 2277 *Meyer*) December; (58 *Merrill*) Decades Philip. Forest Fl., coll. *Barnes*, January. In forests below 200 m. Endemic. T., *Tagatoy*.

4. **P. oleiferum** Blanco, Merr. l. c. 14.

(168 *Barnes*) January; (22 *Whitford*) April; (62 *Merrill*) Decades Philip. Forest Fl., coll. *Barnes*, January. In forests at about 100 m. Endemic. T., *Betis*.

5. **P. tenuipetiolatum** Merr. l. c. **17** (1905) 45.

(154, 191, 516, 520, 555, 566 *Barnes*) January, March; (1247, 1654, 1668, 1686, 2914 *Borden*) June to March. In forests 90 to 500 m. Endemic. T., *Manipnip*.

6. **P. whitfordii** Merr. Govt. Lab. Publ. **35** (1906) 55.

(496 *Barnes*) November; (1015, 1204 *Whitford*) December, March. Rare in forests at 100 m., quite common on ridges at about 1,100 m. Endemic.

3. SIDEROXYLON Linn.

1. **S. angustifolium** Merr. Govt. Lab. Publ. **35** (1906) 56. *Palaquium angustifolium* Merr. l. c. **17** (1904) 43.

(3744 *Merrill*) January; (159, 1166 *Whitford*) May, March. On exposed ridges in the mossy forest 1,000 to 1,100 m. Endemic.

2. **S. duclitan** Blanco Fl. Filip. ed. 1 (1837) 129. *S. ramiflorum* Merr. Govt. Lab. Publ. **17** (1905) 43.

(77 *Barnes*) November; (2308 *Meyer*) December; (2353 *Borden*) January; (225 *Merrill*) Decades Philip. Forest Fl., coll. *Borden*, October. In forests 100 to 200 m. Endemic.

3. **S. macranthum** Merr. Govt. Lab. Publ. **35** (1906) 56.

(1809, 2741 *Borden*) September, March; (51 *Barnes*) October; (291 *Merrill*) Decades Philip. Forest Fl., coll. *Borden*, February. In forests 40 to 150 m. Endemic.

4. MIMUSOPS Linn.

1. **M. elengi** Linn.; Clarke in Hook. f. Fl. Brit. Ind. **3** (1882) 548.

(1285 *Whitford*) May; (154 *Merrill*) Decades Philip. Forest Fl., coll. *Ahern's collector*, July. Thickets near the seashore. British India and Malaya. T., *Bansalaguin*.

EBENACEÆ.

1. DIOSPYROS Dalech.

1. **D. canomoi** A. DC.; Hiern Trans. Camb. Phil. Soc. **12** (1873) **1:** 216.

(113 *Whitford*) May; (152 *Barnes*) January; (3739 *Merrill*) January. On exposed ridges in the mossy forest 900 to 1,200 m. Endemic. T., *Canomoi*.

2. **D. copelandi** Merr. Govt. Lab. Publ. **17** (1904) 45.

(246 *Copeland*) February; (3057 *Borden*) May. In forests 100 to 250 m. Endemic.

3. **D. discolor** Willd.; Hiern l. c. 260. *D. philippinensis* Gurke, non A. DC.

(*Borden*). In thickets below 100 m., widely distributed in the Philippines. Borneo, occasionally cultivated in other tropical countries. T., *Mabolo.*

4. **D. nitida** Merr. Govt. Lab. Publ. **35** (1906) 57.

(6713 *Elmer*) November; (1067 *Whitford*) January; (267 *Merrill*) Decades Philip. Forest Fl., coll. *Borden*, January. In forests 100 to 200 m. Endemic.

5. **D. pilosanthera** Blanco; Hiern l. c. 213.

(564, 582, 584, 595, 600 *Barnes*) March; (709, 710, 833, 1752, 2738, 2952, 3038 *Borden*) May, April; (1225 *Whitford*) April; (148 *Merrill*) Decades Philip. Forest Fl., coll. *Ahern's collector*, July. In forests 100 to 500 m., widely distributed in the Philippines. Endemic. T., *Bolongeta.*

SYMPLOCACEÆ.

1. SYMPLOCOS Linn.

1. **S. confusa** Brand in Engler's Pflanzenreich **6** (1901) 88.

(1185, 1343 *Whitford*) March, September; (3240, 3723, 3960 *Merrill*) October, January, March; (2619 *Meyer*) February; (791 *Borden*) May. On exposed ridges in the mossy forest above 1,200 m. Malayan Peninsula, Southern China, and Borneo.

2. **S. elmeri** Brand in Perk. Frag. Fl. Philip. (1904) 36.

(1333 *Whitford*) May; (2718 *Borden*) February. In forests 150 to 600 m. Endemic.

3. **S. polyandra** (Blanco) Brand in Engler's Pflanzenreich l. c. 36.

(1925 *Borden*) September; (60 *Merrill*) Decades Philip. Forest Fl., coll. *Barnes*, January; (76 *Barnes*) November. In forests 100 to 200 m. Endemic.

4. **S. oblongifolia** (Presl) Vidal; Brand l. c. 55.

(199 *Barnes*) January; (2606 *Meyer*) February; (1223, 1246 *Borden*) June; (133 *Whitford*) May; (189 *Merrill*) Decades Philip. Forest Fl., coll. *Barnes*, January. In forests 300 to 700 m. Endemic.

5. **S.** sp.

(1157, 1196 *Whitford*) March; (2647 *Meyer*) February; (1511 *Ahern's collector*) August. In forests and on exposed ridges 800 to 1,100 m.

CONTORTÆ.

OLEACEÆ.

1. LINOCIERA Sw.

1. **L. coriacea** Vidal Rev. Pl. Vasc. Filip. (1886) 181.

(2305 *Meyer*) December; (1049 *Whitford*) January. In forests at about 100 m. Endemic.

2. **L. cumingiana** Vidal, Phan. Cuming. Philip. (1885) 185.

(749, 1403, 1539, 1552, 1621, 2348 *Borden*) May to January; (2226 *Meyer*) December. (1460 *Ahern's collector*) July; (82, 1023, 1070 *Whitford*) April, December, January. In forests and thickets 40 to 180 m. Endemic.

3. **L. luzonica** (Blume) F.-Vill. Nov. App. (1883) 128.

(2350 *Borden*) January; (1167 *Whitford*) March. In forests, the former at 100 m., the latter apparently dwarfed, at 1,100 m. Possibly not distinct from the preceding species. Endemic.

4. **L. pallida** comb. nov. *Mayepea pallida* Merr. Govt. Lab. Publ. **35** (1906) 58.

(1142 *Whitford*) March; (2792 *Meyer*) March; (2939 *Borden*) March. In forests at 100 m., and on ridges at 900 m. Endemic.

5. **L. racemosa** comb. nov. *Mayepea racemosa* Merr. l. c.

(3042 *Borden*) May. In forests at 60 m. Endemic.

2. LIGUSTRUM Linn.

1. **L. cumingiana** Decne. Nouv. Arch. Mus. Hist. Nat. Paris II. **2** (1879) 28.

(246 *Whitford*) May; (3006 *Meyer*) May; (467 *Topping*) May. On exposed ridges in the mossy forest 900 to 1,100 m. Endemic.

3. JASMINUM Linn.

1. **J. bifarium** Wall.; Clarke in Hook. f. Fl. Brit. Ind. **3** (1882) 595.

(2835 *Meyer*) March. On ridges in the mossy forest at 1,000 m. Malayan Peninsula and Archipelago.

The material represented by the above number is rather imperfect and is referred to the above species with some doubt.

LOGANIACEÆ.

1. MITRASACME Labill.

1. **M. alsinoides** R. Br.; Clarke in Hook. f. Fl. Brit. Ind. **4** (1883) 80.

(3093 *Merrill*) October; (6779 *Elmer*) November. In open dry grass lands below 100 m. British India, Malaya, and Australia.

2. STRYCHNOS Linn.

1. **S. multiflora** Benth.; Hook. Icon. **23** (1894) *pl. 2213*.

(6864 *Elmer*) November. In forests, widely distributed in the Philippines. Endemic.

3. FAGRAEA Thunb.

1. **F. obovata** Wall.; Clarke l. c. 83.

(256 *Whitford*) May; (1899 *Borden*) September. Forests 700 to 900 m. British India and Malaya.

4. GENIOSTOMA Forst.

1. **G. cumingianum** Benth. Journ. Linn. Soc. Bot. **1** (1857) 97.

(3199 *Merrill*) October; (2836 *Meyer*) March. On exposed ridges above 1,000 m. Endemic.

APOCYNACEÆ.

1. ALSTONIA R. Br.

1. **A. parvifolia** Merr. Govt. Lab. Publ. **35** (1906) 59.

(1164 *Whitford*) March; (6876 *Elmer*) November; (2111 *Borden*) November; (2209 *Meyer*) December. On exposed ridges in the mossy forest 900 to 1,200 m. Endemic.

2. **A. scholaris** R. Br.; Hook. f. Fl. Brit. Ind. **3** (1882) 642.

(746, 1636 *Borden*) May, August; (579 *Barnes*) March. In forests 100 to 200 m., widely distributed in the Philippines. Tropical Asia, Africa, Malaya, and Australia. T., *Dita*.

2. PARALSTONIA H. Baill.

1. **P. clusiacea** H. Baill. Bull. Soc. Linn. Paris **1** (1888) 750.

(1793, 1798, 2546 *Borden*) September, February. In forests at 200 m. A monotypic endemic genus.

3. TABERNÆMONTANA Linn.

1. **T. pandacaqui** Poir.; Miq. Fl. Ind. Bat. **2** (1856) 419.

(2252, 2783 *Meyer*) December, February; (2511, 3137 *Merrill*) June, October; (629, 1370, 1790 *Borden*) April to September; (6148 *Leiberg*) July; (370 *Whitford*) June; (6783 *Elmer*) November. Common in forests 100 to 800 m. Endemic. T., *Pandacaqui.*

I have not seen Sonnerat's figure on which this somewhat doubtful species is based, and accordingly the above specimens are referred here tentatively. The form here considered is apparently sufficiently distinct from *T. cumingiana* A. DC., a species widely distributed in the Philippines and universally known to the natives under the same name as the above species.

4. VOACANGA Dup. Th.

1. **V. cumingiana** Rolfe, Journ. Linn. Soc. Bot. **21** (1884) 313.

(1079 *Whitford*) January; (684, 1521, 1755, 2331 *Borden*) May, December; (2282, 3014 *Meyer*) December, May; (3798 *Merrill*) January. In thickets and forests 75 to 200 m. Endemic.

5. ALYXIA Banks.

1. **A. monilifera** Vidal. *Gynopogon monilifera* Merr. Govt. Lab. Publ. **29** (1905) 46.

(6764, 6812 *Elmer*) November; (739, 792, 2112 *Borden*) May, November; (6035 *Leiberg*) July; (2204 *Meyer*) December; (224, 463 *Whitford*) May, July; (3857 *Merrill*) August. On exposed ridges in the mossy forest 900 to 1,200 m. Endemic.

6. KOPSIA Blume.

1. **K. longiflora** Merr. Govt. Lab. Publ. **29** (1905) 47.

(1207 *Whitford*) March; (611, 1802 *Borden*) April, September; (1448 *Ahern's collector*) August. On exposed ridges and in forests 250 to 1,100 m. Endemic.

7. CERBERA Linn.

1. **C. odollam** Gaertn.; Hook. f. Fl. Brit. Ind. **3** (1882) 638.

(2036, 2073, 2475 *Borden*) October, January; (2302 *Meyer*) December; (1435 *Ahern's collector*) August. In thickets along the seashore. Tropical Asia, Malaya, Australia, and Polynesia.

8. PARAMERIA Benth.

1. **P. philippinensis** Radlk. Sitzb. Math. Phys. Akad. Muench. **14** (1884) 519.

(84, 352 *Barnes*) November, March; (2186 *Meyer*) December; (6865 *Elmer*) November. In thickets and forests 20 to 100 m. Borneo. T., *Ductung ahas.*

9. ANODENDRON A. DC.

1. **A. paniculatum** (Roxb.) A. DC.; Hook. f. l. c. 668.

(2607 *Meyer*) February. In forests at 700 m. British India and Malaya.

10. AGANOSMA G. Don.

1. **A. marginata** (Roxb.) G. Don.; Hook. f. l. c. 663. *Echites procumbens* Blanco Fl. Filip. ed. 2 (1845) 78. *Holarrhena macrocarpa* F.-Vill., Nov. App. (1883) 130, non (?) *Physetobasis macrocarpa* Hassk. *Holarrhena procumbens* Merr. Govt. Lab. Publ. **27** (1905) 59.

(3299 *Merrill*) October; (398 *Whitford*) June. In thickets and forests near the river 100 to 200 m. British India and Malaya.

11. CARRUTHERSIA Seem.

1. **C. pilosa** (A. DC.) F.-Vill. Nov. App. (1883) 132.

(3117 *Meyer*) May, 1905. In forests at 950 m. Endemic.

12. ICHNOCARPUS R. Br.

1. **I. ovatifolius** A. DC.; Hook. f. l. c. 670.

(6013 *Leiberg*) July; (1464 *Ahern's collector*) August. In thickets below 100 m., widely distributed in the Philippines. British India and Malaya.

13. WRIGHTIA R. Br.

1. **W. laniti** (Blanco) Merr. Govt. Lab. Publ. **27** (1905) 59. *W. ovata* A. DC.

(1260 *Whitford*) May; (770, 3067 *Borden*) May. In forests and thickets below 130 m. Endemic. T., *Laniti*.

14. PARSONSIA R. Br.

1. **Parsonsia confusa** nom. nov. *Parsonsia rheedii* F.-Vill. Nov. App. (1883) 130; Vidal, Rev. Pl. Vasc. Filip. (1886) 184, non *Heligme rheedii* Wight. *Echites spiralis* Blanco, Fl. Filip. ed. 1 (1837) 110; ed. 2 (1845) 79; ed. 3, **1** (1877) 146; Vidal, Sinopsis, Atlas (1883), *t. 66. f. E.*, non *Parsonsia spiralis* Wall.

(1784 *Borden*) August; (81 *Barnes*) November; (6146 *Leiberg*) July; (1216 *Whitford*) April; (2564, 3141 *Merrill*) June, October. In thickets and forests 20 to 100 m. Endemic.

ASCLEPIADACEÆ.

1. STREPTOCAULON W. et A.

1. **S. baumii** Decne. in DC. Prodr. **8** (1844) 496.

(3142 *Merrill*) October; (6768 *Elmer*) November. In thickets below 100 m., widely distributed in the Philippines. Endemic.

2. CEROPEGIA Linn.

1. **C. cumingiana** Decne. l. c. 643.

(2221 *Meyer*) December; (2066 *Borden*) October. In thickets below 100 m. Endemic.

3. DISCHIDIA R. Br.

1. **D. pectenoides** Pearson, Journ. Linn. Soc. Bot. **35** (1902) 377. *D. lanceolata* Vidal, Sinopsis, Atlas (1883), *t. 68. f. E.*, non Decne.

(2735 *Borden*) March; (49, 1279 *Whitford*) April, May; (2566 *Merrill*) June. In thickets, usually on dead bamboo, below 100 m. Endemic.

2. **D. purpurea** Merr. Govt. Lab. Publ. **17** (1904) 39.

(1182 *Whitford*) March; (3736 *Merrill*) January. On trees, exposed ridges in the mossy forest at about 1,200 m. Endemic.

4. DISCHIDIOPSIS Schlechter.

1. **D. philippinensis** Schlechter in Perk. Frag. Fl. Philip. (1904) 128.

(3809 *Merrill*) April, 1904. In thickets below 50 m. Endemic.

5. HOYA R. Br.

1. **H. cumingiana** Decne. l. c. 636.

(311 *Whitford*) May. An epiphyte in forests at 700 m. Endemic.

This species is abundant in the region of *Pinus insularis*, northern Luzon, where it is always found on bowlders, outcroppings, and cliffs.

2. **H. luzonica** Schlechter l. c. 130.

(2565 *Merrill*) June. In thickets along the river at 150 m. Endemic.

3. **H. multiflora** Blume; Hook. f. l. c. 52.

(129 *Barnes*) January; (2330 *Borden*) December; (1047, 1258 *Whitford*) January, May; (2264 *Meyer*) December. Epiphytic, 75 to 150 m. Malayan Peninsula and Archipelago.

6. MARSDENIA R. Br.

1. **M. philippinensis** Schlechter l. c. 133.

(3315 *Merrill*) October; (6147 *Leiberg*) July. In thickets below 100 m. Endemic.

In addition to the above *Asclepiadaceæ*, 9 other distinct species from the Lamao region are represented in our herbarium, but as duplicates of these are in the hands of Dr. R. Schlechter for identification, no attempt has here been made to determine them.

TUBIFLORÆ.

CONVOLVULACEÆ.

1. RIVEA Choisy.

1. **R. barnesii** Merr. Govt. Lab. Publ. **17** (1904) 40.

(68 *Barnes*) November. In thickets at 30 m. Endemic.

2. **R. luzonensis** Hallier f. Bull. Herb. Boiss. **6** (1898) 715.

(60, 351 *Barnes*) October, March; (2253, 2417 *Meyer*) December, January; (2048, 2391 *Borden*) October, January; (1035 *Whitford*) January; (3120 *Merrill*) October. In thickets along the stream 25 to 500 m. Endemic.

2. QUAMOCLIT Tournef.

1. **Q. vulgaris** Choisy; DC. Prod., **9** (1845) 336.

(3097 *Merrill*) October. In thickets below 100 m., introduced from tropical America, now spontaneous and widely distributed in the Philippines.

3. IPOMŒA Linn.

1. **I. batatas** (Linn.) Lam.; Clarke in Hook. f. Fl. Brit. Ind. **4** (1883) 202.

Occasionally cultivated about Lamao, generally cultivated in tropical and subtropical regions. Sp.-Fil., *Camote*.

2. **I. blancoi** Choisy l. c. 389.

(1606 *Borden*) August. In thickets below 100 m., widely distributed in the Philippines.

3. **I. obscura** (Linn.) Ker; Clarke l. c. 207.

(3099 *Merrill*) October. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia, Africa, and Malaya.

4. **I. paniculata** (Linn.) R. Br. *I. digitata* Linn.; Clarke l. c. 202.

(2020 *Borden*) October; (3288 *Merrill*) October. In thickets on the seashore. Tropics generally.

5. **I. pes-capræ** (Linn.) Roth. *I. biloba* Forsk.; Clarke l. c. 212.

(2069 *Borden*) October; (2293 *Meyer*) December; (*Whitford*) April. Sandy seashore. Tropical shores of both hemispheres.

4. MERREMIA Dennst.

1. **M. gemella** (Burm.) Hallier f. *Convolvulus gemellus* Burm.; *Ipomœa gemella* Roth; Choisy l. c. 380.

(2714 *Borden*) February; (2502 *Meyer*) January. In thickets below 100 m. Tropical Asia and Malaya.

2. **M. hastata** (Lam.) Hallier, Bot. Jahrb. **16** (1893) 552.

(3105 *Merrill*) October; (6119 *Leiberg*) July; (403 *Whitford*) June; (7030 *Elmer*) November; (2503 *Meyer*) January. Abundant in thickets below 100 m., widely distributed in the Philippines. Tropics generally.

3. **M. umbellata** (Meyer) Hallier, f. l. c., var. **orientalis** Hallier f.

(*Whitford*) April. In thickets below 100 m., widely distributed in the Philippines.

5. HEWITTIA W. et A.

1. **H. bicolor** (Vahl.) Wight; Clarke l. c. 216.

(1913 *Borden*) September. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia, Africa, and Malaya.

6. ERYCIBE Roxb.

1. **E.** sp. (?)

(3717 *Merrill*) January. In forests at 600 m., fruiting specimen only.

BORRAGINACEÆ.

1. CORDIA Linn.

1. **C. blancoi** Vidal; Merr. Govt. Lab. Publ. **35** (1906) 61.

(1262 *Whitford*) May; (768, 1267, 1273 *Borden*) May, July; 191 *Merrill*) Decades Philip. Forest Fl., coll *Borden*, July. In thickets below 100 m., widely distributed in the Philippines. Endemic. T., *Anonang.*

2. EHRETIA Linn.

1. **E. microphylla** Lam. *E. buxifolia* Roxb.; Clarke in Hook. f. Fl. Brit. Ind. **4** (1883) 144.

(2538 *Merrill*) June; (1603 *Borden*) August; (6850 *Elmer*) November. In thickets below 100 m., widely distributed in the Philippines. British India and Malaya. T., *Cha, Cha bundoc.*

2. **E. philippinensis** A. DC. in DC. Prodr. **9** (1845) 504.

(2103 *Borden*) November; (6830 *Elmer*) November. In forests at about 300 m. Endemic.

3. TOURNEFOURTIA Linn.

1. **T. sarmentosa** Lam.; A. DC. l. c. 516.

(2525 *Merrill*) June; (15 *Whitford*) April; (2844 *Meyer*) March. In thickets and forests along streams 100 to 900 m. Malaya and Australia.

4. HELIOTROPIUM Linn.

1. **H. indicum** Linn.; Clarke l. c. 152.

(1954 *Borden*) October. A weed in waste places, widely distributed in the Philippines. Tropics generally. Sp.-Fil., *Trompa elefante.*

VERBENACEÆ.

1. CALLICARPA Linn.

1. **C. bicolor** Juss.; Schauer in DC. Prodr. **11** (1857) 642.

(1484 *Ahern's collector*) July. In forests. Malaya and Australia.

2. **C. blancoi** Rolfe Journ. Linn. Soc. Bot. **21** (1884) 315.

(2520 *Meyer*) February; (55 *Barnes*) October; (2522 *Merrill*) June; (404 *Whitford*) June. In thickets below 100 m. Endemic. T., *Tubang dalag.*

The specimens cited above agree with the figure cited by Rolfe as representing this species, but are quite distinct from No. 1283 *Cuming,* which is referred by Schauer to *Callicarpa bicolor* Juss., and which species Rolfe states must be excluded from the Philippine flora.

3. **C. formosana** Rolfe Journ. Bot. **20** (1882) 358.

(6000 *Leiberg*) July. In forests at about 80 m. Formosa.

4. **C. erioclona** Schauer in DC. Prodr. **11** (1857) 643.

(2536 *Merrill*) June; (1595 *Borden*) August; (6018 *Leiberg*) July; (487 *Whitford*) July; (6647 *Elmer*) November. In thickets along streams below 150 m. Endemic.

2. PREMNA Linn.

1. **P. nauseosa** Blanco; Schauer l. c. 638.

(769, 1271, 1275, 1613 *Borden*) May, October; (6841 *Elmer*) November; (387 *Whitford*) June. In thickets below 100 m. Endemic. T., *Molauin aso.*

2. **P. odorata** Blanco; Schauer l. c. *P. vestita* Schauer l. c. 631.

(2590 *Meyer*) February. In thickets below 100 m. Endemic. T., *Alagao.*

3. **P. cumingiana** Schauer l. c. 634.

(*Whitford*). In thickets below 100 m., widely distributed in the Philippines. Endemic.

4. **P. integrifolia** Linn.; Clarke in Hook. f. Fl. Brit. Ind. **4** (1885) 574.

(2043 *Borden*) September. In thickets along the seashore. British India to Malaya.

3. VITEX Linn.

1. **V. littoralis** Decne.; *V. timorensis* Walp.; Schauer l. c. 686.

(1243 *Whitford*) May; (771, 2022 *Borden*) October; (1445 *Ahern's collector*) August. In thickets near the seashore, widely distributed in the Philippines. Timor. T., *Malauin, Molave.*

2. **V. negundo** Linn.; Clarke in Hook. f. Fl. Brit. Ind. **4** (1885) 583.

(2035 *Borden*) October; (2276 *Meyer*) December. In thickets near the seashore, widely distributed in the Philippines. Tropical Asia and Malaya.

3. **V. ovata** Thunb. *V. trifolia* Linn. var. *unifoliolata* Schauer l. c. 683.

(1940 *Borden*) October. Sandy seashore. Tropical shores Asia and Malaya.

4. **V. turczaninowii** Merr. Govt. Lab. Publ. **35** (1906) 77.

(1335 *Borden*) May; (3059 *Borden*) May. In forests 100 to 150 m. Endemic. T., *Malausa.*

5. **V.** sp.

(*Whitford*). A large tree in forests, sterile specimens only.

4. GMELINA Linn.

1. **G. hystrix** Kurz; Clarke l. c. 582.

(6105 *Leiberg*) July; (362 *Barnes*) March; (395 *Whitford*) June; (1780 *Borden*) August. In open thickets below 100 m. Burma, Siam. T., *Calulut.*

5. CLERODENDRON Linn.

1. **C. blancoi** Naves; Merr. Govt. Lab. Publ. **35** (1906) 62.

(6012, 6115 *Leiberg*) July; (1609, 1915 *Borden*) August, September; (418 *Whitford*) June; (3089, 3866 *Merrill*) October, August. In thickets below 100 m., widely distributed in the Philippines. Endemic. T., *Bagauac.*

2. **C. inerme** Gaertn.; Clarke l. c. 589.

(146 *Merrill*) Decades Philip. Forest Fl., coll. *Ahern's collector*, July. In tidal thickets. Tropical Asia and Malaya.

3. **C. intermedium** Cham.; Schauer l. c. 669.

(3153 *Merrill*) October; (2177 *Meyer*) December; (1324 *Borden*) July; (483 *Whitford*) July; (6678 *Elmer*) November. In thickets and damp places below 100 m., widely distributed in the Philippines. Endemic.

4. **C. quadriloculare** (Blanco) Merr. Govt. Lab. Publ. **35** (1906) 63.

(339 *Barnes*) February; (6767, 6762 *Elmer*) November; (3746 *Merrill*) January; (2521 *Meyer*) February. In forests 50 to 700 m. Endemic.

6. SYMPHOREMA Roxb.

1. **S. luzonicum** (Blanco) F.-Vill.; Perk. Frag. Fl. Philip. (1904) 3.

(343 *Barnes*) February; (2516 *Meyer*) January; (2549 *Borden*) February; (2 *Whitford*) April. In thickets along the river 75 to 150 m., widely distributed in the Philippines. Endemic.

7. AVICENNIA Linn.

1. **A. officinalis** Linn.; Clarke l. c. 604.

(140 *Merrill*) Decades Philip. Forest Fl., coll. *Ahern's collector*, July; (1265 *Whitford*) May. Mangrove swamps. Tropical shores of Asia, Malaya, and Polynesia. T., *Calapini.*

LABIATÆ.

1. SCUTELLARIA Linn.

1. **S. luzonica** Rolfe Journ. Linn. Soc. Bot. **21** (1884) 315.

(2217 *Meyer*) December; (2110 *Borden*) November; (6984 *Elmer*) November; (*Copeland*) January; (203 *Whitford*) May; (3114 *Merrill*) October. On exposed ridges, mossy forest 600 to 1,200 m., occasionally along the river below to 100 m. Formosa.

2. LEUCAS R. Br.

1. **L. zeylanica** (Linn.) R. Br.; Hook. f. Fl. Brit. Ind. **4** (1885) 689.

(6093 *Leiberg*) July; (514 *Whitford*) July; (3095 *Merrill*) October. In open grass lands below 100 m. Tropical Asia and Malaya.

3. ANISOMELIS R. Br.

1. **A. indica** (Linn.) O. Kuntze. *A. ovata* R. Br.; Hook. f. l. c. 672.

(2184 *Meyer*) December. In thickets and open places below 100 m. Tropical Asia and Malaya.

4. HYPTIS Jacq.

1. **H. brevipes** Poir.; Benth. l. c. 107.

(3270 *Merrill*) October. In open places below 100 m., widely distributed in the Philippines, introduced from tropical America. Malaya, tropical Africa, and Asia.

2. **H. spicigera** Lam.; Benth. l. c. 87.

(3293 *Merrill*) October. With the preceding, introduced from tropical America.

3. **H. suaveolens** (Linn.) Poir.; Benth. l. c. 126.

(1782 *Borden*) August; (*Whitford*) July. With the preceding, distribution of *Hyptis brevipes* Poir.

5. COLEUS Lour.

1. **C. multiflorus** Benth. l. c. 75.

(6720 *Elmer*) November; (1582, 2115, 3068 *Borden*) August, May; (185 *Whitford*) May; (3741 *Merrill*) January. On exposed ridges in the mossy forest and in ravines 600 to 1,200 m. Endemic.

SOLANACEÆ.

1. CAPSICUM Linn.

1. **C. frutescens** Linn.; Prain in King & Gamble, Journ. As. Soc. Beng. **74** (1905) **2:** 337.

(6846 *Elmer*) November. In thickets and waste places near Lamao. Commonly cultivated and subspontaneous throughout the Philippines. Tropical Asia and Malaya. T., *Sili.*

2. SOLANUM Linn.

1. **S. ferox** Linn.; Clarke l. c. 233.

(2233 *Meyer*) December; (6732 *Elmer*) November; (515 *Whitford*) July. Usually a weed in cultivated grounds below 100 m., also on recently burned places near the summit of the mountain. Tropical Asia.

2. **S. cumingii** Dun. in DC. Prodr. **13** (1852) **1:** 363.

(1948 *Borden*) October. In open places and thickets below 100 m.

Reduced to *S. melongena* Linn., by Clarke, but quite different from the cultivated forms of that species.

3. **S. nigrum** Linn.; Clarke l. c. 229.

(2070 *Borden*) October. In thickets and open lands below 100 m. Temperate and tropical regions of the world.

4. **S. torvum** Swartz; Clarke l. c. 234.

(2285 *Meyer*) December; (2336 *Borden*) December. In thickets below 100 m. Malaya, tropical Asia, and America.

5. **S. verbascifolium** Linn.; Clarke l. c. 230.

(7029 *Elmer*) November; (2523 *Meyer*) February. In thickets below 100 m. Malaya, tropical Asia, Australia, and America.

3. NICOTIANA Linn.

1. **N. tabacum** Linn.; Clarke l. c. 245.

(1351 *Whitford*) September. In Negrito "caingins" (clearings) at 400 m., not spontaneous. Native of tropical America, cultivated in most temperate and tropical countries. Sp.-Fil., *Tabaco.*

SCROPHULARIACEÆ.

1. LIMNOPHILA R. Br.

1. **L. gratissima** Blume; Hook. f. Fl. Brit. Ind. **4** (1884) 268.

(2268 *Meyer*) December. In shallow, stagnant water and along streams below 50 m. British India to Japan, Malaya, and Australia.

2. TORENIA Linn.

1. **T. peduncularis** Benth.; Hook. f. l. c. 276.

(6743 *Elmer*) November. In thickets below 100 m. British India and Malaya.

3. VANDELLIA Linn.

1. **V. crustacea** (Linn.) Benth.; Hook. f. l. c. 279.

(2062 *Borden*) October; (6780 *Elmer*) November; (3267 *Merrill*) October. In open grass lands below 100 m. Tropics of the Old World, introduced into the New.

2. **V. scabra** Benth.; Hook. f. l. c. 281.

(3266 *Merrill*) October. With the preceding. Tropical Asia, Africa, and Malaya.

3. **V.** sp.

(2027 *Borden*) October. On bluffs near the seashore.

4. BONNAYA Link. et Otto.

1. **B. brachiata** Link et Otto.; Hook. f. l. c. 284.

(6781 *Elmer*) November; (3106 *Merrill*) October. In open waste lands and grassy places below 100 m. British India and Malaya.

5. SCOPARIA Linn.

1. **S. dulcis** Linn.; Clarke l. c. 289.

(*Whitford*) April; (*Copeland*) January. In thickets and open places below 100 m., widely distributed in the Philippines. Tropics generally, a native of tropical America.

BIGNONIACEÆ.

1. OROXYLUM Vent.

1. **O. indicum** (Linn.) Vent.; Clarke in Hook. f. Fl. Brit. Ind. 4 (1884) 278.

(*Whitford*) June; (6863 *Elmer*) November; (1277, 1280, 1301, 1309 *Borden*) July. In thickets below 100 m. Tropical Asia and Malaya. T., *Pincapincahan*.

2. RADERMACHERA Hassk.

1. **R. banaibana** Bureau in Baill. Adansonia 2 (1861–62) 194. *Stereospermum banaibanai* Rolfe.

(185, 548 *Barnes*) January, March; (2424 *Meyer*) January; (24 *Whitford*) April; (81 *Merrill*) Decades Philip. Forest Fl. coll. *Barnes*, March, distributed as *S. seemannii* Rolfe. (725, 1541, 1542, 1540, 1550, 1566, 2469 *Borden*) May to January. In forests 75 to 150 m. Endemic. T., *Banaibanai*.

PEDALIACEÆ.

1. SESAMUM Linn.

1. **S. indicum** Linn.; Clarke in Hook. f. Fl. Brit. Ind. 4 (1884) 387.

(1914 *Borden*) September. In an old clearing at about 20 m., occasionally cultivated and subspontaneous in the Philippines, cultivated in all tropical countries. T., *Linga*.

GESNERIACEÆ.

1. TRICHOSPORUM Don.

1. **T. philippinensis** (Clarke) O. Kuntze. *Aeschynanthus philippinensis* Clarke in DC. Monog. Phan. 5 (1883) 39.

(3748, 3855 *Merrill*) January, August. In the mossy forest, exposed ridges 1,000 to 1,200 m. Endemic.

2. **CYRTANDRA** Forst.

1. **C. incisa** Clarke l. c. 250.

(2409 *Meyer*) January; (29, 1112 *Whitford*) May, February. In ravines along the river 400 to 800 m. Endemic.

ACANTHACEÆ.

1. **THUNBERGIA** Linn. f.

1. **T. fragrans** Roxb.; Clarke in Hook. f. Fl. Brit. Ind. **4** (1884) 390.

(*Merrill*). In thickets below 100 m. Tropical Asia, Malaya, and Australia.

2. **BLECHUM** P. Br.

1. **B. brownei** Juss.; Nees in DC. Prodr. **11** (1857) 467.

(91 *Whitford*) April. In thickets and waste places below 100 m., widely distributed in the Philippines, generally considered to have been introduced from tropical America.

3. **HEMIGRAPHIS** Nees.

1. **H. parabolica** (Nees) F.-Vill.; *Ruellia parabolica* Nees l. c. 144.

(495 *Whitford*) July, 1904. In thickets along the river below 100 m. Endemic.

2. **H. rapifera** Hallier f. ex Koorders in Meded. 's Lands. Plantent. **19** (1898) 555.

(6667 *Elmer*) November; (3150 *Merrill*) October; (438 *Whitford*) June; (1930 *Borden*) October. On ridges in the mossy forest at 1,200 m., extending below along the river to 100 m. Celebes.

4. **STROBILANTHES** Blume.

1. **S. merrillii** C. B. Clarke, Govt. Lab. Publ. **35** (1906) 92.

(6815 *Elmer*) November; (1581, 2094 *Borden*) August, September; (155 *Whitford*) May; (3713 *Merrill*) January. On exposed ridges in the mossy forest above 1,200 m. Endemic.

2. **S. pluriformis** C. B. Clarke, l. c. 93.

(3956 *Merrill*) March; (1092 *Whitford*) February. With the preceding. Endemic.

5. **RUELLIA** Linn.

1. **R. repens** Linn.; Clarke in Hook. f. l. c. 412.

(3110 *Merrill*) October; (2054 *Borden*) October. (411 *Whitford*) June. In thickets below 100 m. China, Malayan Peninsula and Archipelago.

6. **LEPIDAGATHIS** Willd.

1. **L. incurva** D. Don. *L. hyalina* Nees, l. c. 252.

(493 *Whitford*) July; (3119 *Merrill*) October. On banks along the river below 150 m. British India to China and Malaya.

7. **BARLERIA** Linn.

1. **B. prionitis** Linn.; Clarke in Hook. f. l. c. 482.

(2343 *Borden*) December. In thickets and waste places below 100 m. Tropical Asia, Africa, and Malaya.

8. GYMNOSTACHYUM Nees.

1. **G. affine** Nees, l. c. 94.

(2732 *Borden*) March; (300 *Copeland*) January. In forests 75 to 150 m. Endemic.

9. ACANTHUS Linn.

1. **A. ilicifolius** Linn.; Clarke l. c. 481.

(2232 *Meyer*) December. In tidal thickets, common. Seashores British India to Malaya and Australia. T., *Dolariu.*

10. ERANTHEMUM Linn.

1. **E. bicolor** Schrank; Nees l. c. 456.

(2267 *Meyer*) December; (2365 *Borden*) January; (7021 *Elmer*) November; (44 *Whitford*) April. Abundant in thickets below 100 m., widely distributed in the Philippines. Malaya.

2. **E. curtatum** C. B. Clarke Govt. Lab. Publ. **35** (1906) 89.

(3952 *Merrill*) March; (2727 *Borden*) March. In forests 100 to 200 m. Endemic.

11. HYPOESTES R. Br.

1. **H. cinerea** C. B. Clarke, l. c. 89.

(2292 *Meyer*) December. In thickets below 100 m. Endemic.

2. **H. subcapitata** C. B. Clarke, l. c. 90.

(751, 2367, 2561 *Borden*) May, February; (2288 *Meyer*) December; (173 *Barnes*) January. In thickets and recent clearings 100 to 150 m. Endemic.

12. JUSTICIA Linn.

1. **J. gendarussa** Linn.; Clarke in Hook. f. l. c. 532.

(2426 *Meyer*) January; (188 *Barnes*) January; (2485 *Borden*) January; (25 *Whitford*) April. Along streams in forests 25 to 200 m., certainly indigenous, rarely or never cultivated in the Philippines.

2. **J. luzonensis** C. B. Clarke Govt. Lab. Publ. **35** (1906) 91.

(2363 *Borden*) January; (3117, 3253 *Merrill*) October; (6727 *Elmer*) November; (6151 *Leiberg*) July; (*Copeland*) January. In forests and on ridges 100 to 1,200 m. Endemic.

13. ROSTELLULARIA Reichb.

1. **R. procumbens** (Linn.) Nees l. c. 371.

(2029 *Borden*) October. In thickets below 100 m. Tropical Asia to Malaya and Australia.

RUBIALES.

RUBIACEÆ.[1]

1. OLDENLANDIA Linn.

1. **O. filifolia** Elmer in herb.

A slender erect, simple or somewhat branched annual 5 to 14 cm. high. Stems and branches slender, striate, glabrous or slightly pubescent. Leaves linear or

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[1] Mr. A. D. E. Elmer, formerly of this Bureau, had partly worked over the *Rubiaceæ* represented in the herbarium, previous to his transfer to another Bureau, and his identifications have been accepted where they are apparently correct.

filiform, 1 to 2.5 cm. long, 1.5 mm. wide or less, sessile, glabrous or scabrous above, slightly pubescent beneath, the margins recurved; stipules united, hyaline, with two or three filiform segments 2 to 3 mm. long. Flowers sessile in the leaf axils, or shortly pediceled, solitary or 2 to 3 in each axil. Calyx 3 mm. long, ciliate, 4-lobed, the lobes recurved, acuminate. Corolla white, tubular, 4 mm. long, pubescent inside, 4-lobed, the segments oblong, obtuse, 1.5 mm. long, ultimately spreading. Stamens 4, the filaments glabrous, 1.5 mm. long. Ovary globose; style persistent, slender, 3 mm. long, glabrous, the 2 stigmatic arms strongly recurved. Capsule about 2 mm. long, hispid-ciliate, 2-celled. Seeds numerous, minute, brown, angular.

(3295 *Merrill*) October, 1903. On bluffs along the seashore, not common.

2. **O. nudicaulis** Roth.; Hook. f. Fl. Brit. Ind. **3** (1880) 70.

(3303 *Merrill*) October. Along trails in forests at 100 m. Tropical Asia and Malaya.

3. **O. paniculata** Linn.; Hook. f. l. c. 69.

(489 *Whitford*) July; (6020 *Leiberg*) July; (1928 *Borden*) October; (2494 *Merrill*) June. In thickets and open forests 50 to 150 m. Tropical Asia to Malaya and Polynesia.

2. HEDYOTIS Linn.

1. **H. congesta** R. Br.; Hook. f. l. c. 61.

(1224, 1579, 1583, 2379, 3061 *Borden*) June, May; (6822 *Elmer*) November; (3243, 3753, 3894 *Merrill*) October, August, January; (287 *Copeland*) February; (212 *Whitford*) May. In forests 100 to 1,200 m. Malayan Peninsula and Archipelago.

Possibly two species are included in the above, the material from the higher altitudes being somewhat different from specimens collected in the lower forests. The identification has been made from the description only, the material having been named by Mr. Elmer, in herb., *Knoxia corymbosa*.

2. **Hedyotis elmeri** Merrill, sp. nov.

A shrub 1 to 3 m. high, glabrous or nearly so throughout. Branches brown or greenish, glabrous, more or less 4-angled. Leaves oblong-ovate, submembranous, often yellowish when dry, 5 to 10 cm. long, 2 to 4.5 cm. wide, glabrous, shining above, the base acute, the apex blunt acuminate; nerves 6 to 7 on each side of the midrib, somewhat prominent beneath, loosely anastomosing, the reticulations lax; petioles 0.5 to 3 cm. long; stipules pectinate or tri-partite, the lobes slender, 2 to 3 mm. long, glandular at the apex. Cymes terminal and axillary, many flowered, glabrous, usually about 6 cm. long, the peduncles 3 to 4 cm. long. Calyx glabrous, 4 to 5 lobed, 3.5 mm. long, the lobes ovate, acute, 1 mm. long; pedicels about 2 mm. long. Corolla white, more or less funnel-shaped, 6 to 7 mm. long, glabrous outside, densely hairy within, 4 to 5 lobed, the lobes oblong ovate, 3 mm. long, acute. Stamens equaling the corolla; anthers linear oblong, 2 mm. long. Fruit oblong ovoid, 4.5 mm. long including the persistent calyx lobes, glabrous, separating into 2 cocci. Seeds 1 mm. long, black, angular.

(793, 2113 *Borden*) November, May; (2210 *Meyer*) December; (151 *Whitford*) May; (3227 *Merrill*) October; (6834, 6979 *Elmer*) November. On exposed ridges in the mossy forest above 1,000 m. *Hedyotis stylosa* Elmer, in herb., non R. Br.

3. OPHIORRHIZA Linn.

1. **O. oblongifolia** DC. l. c. 415.

(205, 258, 350, 509 *Whitford*) May, July; (2178 *Meyer*) December. On damp, shaded banks along the river 50 to 800 m. Endemic.

4. ARGOSTEMMA Wall.

1. **A. neesianum** Walp. Nov. Act. Acad. Cur. **19** (1843) Suppl. **1**: 349.

(3126 *Merrill*) October; (6657 *Elmer*) November; (97, 183, 435 *Whitford*) April, June; (290 *Copeland*) January. On damp mossy ledges along streams 100 to 600 m. Endemic.

5. WENDLANDIA Bartl.

1. **Wendlandia brachyantha** Merrill, sp. nov.

A shrub or small tree about 5 m. high. Branches brown, glabrous, striate, the younger parts often densely ferruginous pubescent. Leaves oblong ovate to ovate lanceolate, coriaceous, entirely glabrous, or the midrib beneath somewhat pubescent, 9 to 12 cm. long, 3 to 5 cm. wide, brown when dry, shining on both surfaces but somewhat paler beneath, entire, short acuminate, the base acute or obscurely rounded; nerves prominent beneath, 10 to 12 pairs; petioles 1 to 1.5 cm. long, pubescent or glabrous; stipules entire. Panicles terminal, pyramidal, many flowered, 12 to 15 cm. long, very densely ferruginous pubescent in anthesis, becoming more or less glabrous in infrutescence, the lower branches about 5 cm. long, the upper gradually shorter. Flowers white, sessile or short pedicelled, about 4 mm. long, each subtended by one or two linear pubescent bracteoles. Calyx cup-shaped, 1.7 mm. long, densely pubescent, 5-toothed, the teeth short, acute. Corolla, including the lobes, 3 mm. long, glabrous or with few ciliate hairs on the inner side of the corolla lobes, the tube about 2 mm. long, the 5 lobes elliptical, rounded, reflexed, about 1 mm. long. Stamens equaling the corolla lobes; anthers 1 mm. long. Style 2 mm. long, glabrous; stigmas obovoid. Fruit ovoid or subglobose, about 2 mm. in diameter, pubescent with few short scattered hairs, crowned by the persistent calyx lobes.

(449 *Whitford*) July, 1904 (type). On exposed ridges in the mossy forests at 1,100 m. Also No. 3834 *Merrill,* Mount Arayat, Province of Pampanga, Luzon, May, 1904, at an altitude of 870 m.

A species at once distinguishable from *Wendlandia luzoniensis* DC., by its smaller glabrous leaves and very short flowers. *Wendlandia paniculata* Elmer, in herb., non DC.

6. UNCARIA Schreb.

1. **U.** sp.

(*Whitford*). In thickets below 100 m., sterile specimen.

7. NAUCLEA Linn.

1. **N. media** Haviland, Journ. Linn. Soc. Bot. **33** (1897) 56.

(3125 *Merrill*) October; (2817 *Meyer*) March. In forests, river cañon 100 to 450 m. Endemic.

2. **N. philippinensis** (Vid.) Haviland l. c. 52.

(2625 *Meyer*) February; (1158 *Whitford*) March. In forests 600 to 900 m. Endemic.

8. SARCOCEPHALUS Afzel.

1. **S. cordatus** Miq.; Haviland l. c. 27.

(374 *Whitford*) June; (727, 1263, 1386, 1391, 1568 *Borden*) May to August. In thickets and forests below 150 m., widely distributed in the Philippines. Southeastern Asia to Malaya and Australia. T., *Bancal.*

9. MUSSÆNDA Linn.

1. **M. grandiflora** (Meyen) Rolfe, Journ. Linn. Soc. Bot. **21** (1884) 311.

(6095 *Leiberg*) July; (1220 *Borden*) June; (388, 524 *Whitford*) June, July;

(6673 *Elmer*) November. In thickets below 100 m., exceedingly variable and perhaps not distinct from the widely distributed *Mussaenda frondosa* Linn.

2. **M. anisophylla** Vid. Phan. Cuming. Philip. (1885) 178.

(2508 *Merrill*) June; (3020 *Meyer*) May. In forests 150 to 300 m. Endemic.

10. UROPHYLLUM Wall.

1. **Urophyllum bataanense** Elmer in herb.

A shrub 1 to 3 m. high. Branches light brown or grayish, glabrous, terete or obscurely angled. Leaves opposite, subcoriaceous, ovate lanceolate to elliptical lanceolate, short, sharp acuminate, the base acute, glabrous except for few scattered ciliate hairs on both surfaces, shining, 9 to 16 cm. long, 3 to 7 cm. wide; nerves 10 to 13 on each side of the midrib; prominent beneath, the reticulations distinct; petioles 2 to 3.5 cm. long; stipules ovate, acute or acuminate, membranous, ciliate above, about 1.5 cm. long, caducous, the stipular scar ciliate. Flowers axillary, solitary, or two or three in a short raceme, subtended by short ciliate bracts, the pedicels about 1 cm. long, glabrous. Calyx glabrous, campanulate, thick, 5 mm. long, the teeth broad, short, obscure. Corolla glabrous outside, 8 mm. long, the lobes about 4 mm. long, the tube 3 to 4 mm. in diameter below, constricted above at the pilose throat, the 5 segments reflexed. Filaments 5, alternating with the corolla segments. Stigma 3-lobed. Fruit glabrous, 5-celled with many seeds in each cell, subglobose or somewhat compressed, about 5 mm. in diameter, the seeds subglobose, pitted, about 0.5 mm. in diameter.

(1335, 2080 *Borden*) July, November, 1904; (2213 *Meyer*) December, 1904; (461 *Whitford*) July, 1904; (3186, 3874 *Merrill*) October, 1903, August, 1904; (6810 *Elmer*) November, 1904. On exposed ridges in the mossy forest above 900 m.

2. **Urophyllum acuminatum** Merrill, sp. nov.

A shrub 3 to 5 m. high. Branches slender, light gray, pubescent with appressed hairs. Leaves opposite, lanceolate to oblong lanceolate, long, slender acuminate, the base acute, submembranous, the nerves and midrib beneath, and frequently also above, appressed pubescent, becoming more or less glabrous, usually pale when dry and somewhat shining, 5 to 8 cm. long, 1.5 to 3 cm. wide; nerves about 6 on each side of the midrib, curved-ascending, prominent beneath; petioles 1 cm. long or less, slender, pubescent. Flowers solitary or in very short 3 or 4 flowered axillary cymes, white, subsessile, or the pedicels 2 to 3 mm. long, subtended by 2 or 3 lanceolate pubescent bracts about 2 mm. long. Calyx cup-shaped, obscurely toothed, very slightly pubescent, 3 mm. long. Corolla including the lobes 5 mm. long, glabrous outside, the tube 2 mm. long, densely villous at the throat inside, the lobes usually 6, spreading or reflexed, oblong ovate, acute, 3 mm. long. Anthers 1 mm. long. Fruit subglobose, glabrous, fleshy, about 5 mm. in diameter, purplish when mature, the numerous seeds reddish, subglobose, minutely pitted, 0.5 mm. in diameter.

(236 *Whitford*) May, 1904; (6047 *Leiberg*) July, 1904; (1334 *Borden*) July, 1904; (3188 *Merrill*) October, 1903; (2825 *Meyer*) March, 1905; (6814 *Elmer*) November, 1904. In the mossy forest on exposed ridges above 900 m. *Urophyllum streptopodium* Elmer in herb., non Wall.

11. STYLOCORYNA Cav., non W. et A.

1. **S. macrophylla** Bartl. in DC. Prodr. 4 (1830) 377. (?)

(2573, 3030 *Borden*) February, May; (1245 *Whitford*) May. In forests 150 to 350 m. Endemic.

12. **RANDIA** Houst.

1. **R. angatensis** (Blanco) F.-Vill. Nov. App. (1883) 108.

(2604 *Meyer*) February. In forests at 900 m. Endemic.

2. **R. cumingiana** Vidal, Phan. Cuming. Philip. (1885) 179.

(1779, 1958, 2123, 3049 *Borden*) August May; (6871 *Elmer*) November; (3090 *Merrill*) October; (1458 *Ahern's collector*) August. In thickets below 100 m. Endemic.

3. **R. densiflora** (Wall.) Benth.; Hook. f. Fl. Brit. Ind. **3** (1880) 112.

(6873 *Elmer*) November; (2047 *Borden*) October; (1472 *Ahern's collector*) August. In forests at about 200 m. Tropical Asia to Malaya and Australia.

4. **Randia whitfordii** (Elmer).

A small tree 7 to 10 m. high. Branches glabrous, light gray. Leaves opposite, subcoriaceous, glabrous, oblong to narrowly elliptical-lanceolate or oblong-lanceolate, acuminate, the acumen abrupt, rather sharp, the base acute, 8 to 15 cm. long, 2.5 to 6 cm. wide, usually pale when dry and slightly shining; nerves 5 to 7 on each side of the midrib, somewhat prominent beneath, curved-ascending; petioles glabrous, about 8 mm. long; stipules coriaceous, 5 mm. long, sharply acuminate. Flowers fascicled or in very short congested axillary cymes, white, very fragrant, 3 to 5 or more in each fascicle, the inflorescence glabrous. Calyx cup-shaped, 2 mm. long, short pediceled or sessile, with 4 minute distant teeth. Corolla tube 4 mm. long, glabrous outside, densely hirsute within except at the base, the lobes 4, spreading, oblong, about 9 mm. long, 4 mm. wide, acute or acuminate, glabrous outside, more or less pilose on the inner surface. Stamens 4; filaments glabrous, 2 mm. long; anthers oblong-lanceolate, 4 mm. long. Ovary 2-celled, ovules several in each cell. Stigma bifid, the arms flattened. Fruit usually solitary in axils of fallen leaves on 5 mm. long bracteate peduncles, globose, 2.5 cm. in diameter, firm, glabrous, minutely roughened, marked at the apex with a large circular ring, the calyx not persistent, the pericarp hard, rather brittle when dry, 5 to 8 mm. thick, 2-celled, the placenta very thin. Seeds 9 to 12 in each cell, irregularly strongly flattened, circular in outline, about 5 mm. in diameter, brown, strongly imbricated, pulp wanting.

(2787, 2998 *Meyer*) February, May; (1212, 2929 *Borden*) June, May; (3725 *Merrill*) January; (202, 1123 *Whitford*) May; (6643 *Elmer*) November. Also from the Province of Rizal, Luzon (1726 *Merrill*); (No. 2988 *Ahern's collector*) *Gardenia whitfordii* Elmer in herb., *Randia fasciculiflora* Elmer in herb., in part. In forests 150 to 700 m.

5. **R. fitzalani** F. Muell. in Benth. Fl. Austr. **3** (1866) 411.

(2279, 2996 *Meyer*) August; (3031 *Borden*) May; (360, 1017, 1057, 1239 *Whitford*) May; (586 *Barnes*) March. In forests 100 to 700 m. Australia.

I have been unable to verify Mr. Elmer's identification of the above material, but as the specimens agree rather closely with the description of the above species, his determination is provisionally accepted.

6. **Randia uncaria** Elmer, n. sp. in herb.

Scandent, 6 to 8 m. high, the branches with stout recurved spines about 1 cm. long. Branches glabrous, slender, light gray or brown. Leaves opposite, equal, glabrous throughout, oblong to oblong-ovate or oblong-lanceolate, rather sharply acuminate, the base acute, 10 to 18 cm. long, 3.5 to 6 cm. wide, subcoriaceous; nerves about 8 on each side of the midrib, prominent beneath, anastomosing, the reticulations lax; petioles about 1 cm. long, usually rugose; stipules glabrous, 4 mm. long, acuminate; spines axillary or in the axils of fallen leaves on the older branches, glabrous. Inflorescence terminal, cymosely paniculate, the peduncle short, stout, the branches few, short, few flowered, the branches and pedicels subtended by small bracts and bracteoles. Calyx tubular, 7 mm. long, very slightly pubescent 5 to 7 toothed, the slender teeth less than 2 mm. long. Corolla white, the tube slender, 2 to 2.5 cm. long, about 2 mm. in diameter, glabrous outside, pubescent inside above the middle, the lobes 5, spreading, 12 mm. long, 4 mm. wide, obtuse or acute. Stamens 5, the filament very short, slender, pubescent; anthers linear, 6 mm. long, acuminate, the base sagittate. Style glabrous, the stigma cleft into 2 flattened arms. Fruit subglobose or ovoid, about 1 cm. in diameter, 2-celled. Seeds triquetrous, black, 3 to 5 in each cell, embedded in a pulpy mass.

(1751, 2730 (type) *Borden*) August, March; (1251 *Whitford*) May; (3943 *Merrill*) March; (7001 *Elmer*) November; (6006 *Leiberg*) July. In forests 100 to 400 m. The flowers very fragrant. Apparently closely related to *R. longiflora* Lam.

13. GARDENIA Ellis.

1. **G. barnesii** Merr. Govt. Lab. Publ. **17** (1904) 47.

(163 *Barnes*) January; (2788 *Meyer*) February; (1235 *Whitford*) May; (2916 *Borden*) March; (6714 *Elmer*) November. In forests 100 to 500 m. Endemic.

2. **G.** sp.

(1479 *Ahern's collector*) August; (2041 *Borden*). In thickets on bluffs by the seashore, in fruit only. Considered by Mr. Elmer to be a distinct, undescribed species of *Gardenia*, but the material, with fruit only, is too imperfect to warrant a description.

14. TRICALYSIA A. Rich.

1. **T.** sp.

(1061 *Whitford*) January; (1374, 2928 *Borden*) July, March. In forests 130 to 500 m., considered by Mr. Elmer to be a distinct undescribed species, but the material is too imperfect to warrant description at this time.

2. **T.** sp.

(1507 *Ahern's collector*) July; (6900 *Elmer*) November; (1306 *Whitford*) June; (3113 *Meyer*) May. In forests on exposed ridges above 900 m. A species apparently closely related to and possibly identical with *Diplospora singularis* Korth. *Randia fasciculiflora* Elmer in herb., in part.

15. PLECTRONIA Linn.

1. **P. peduncularis** (Cav.) Elmer, in herb. *Canthium pedunculare* Cav. Icon. **5** (1799) 21. *t. 436.*

(1221 *Borden*) June; (401 *Whitford*) June; (2545 *Merrill*) June. In thickets below 100 m. Endemic.

2. **P. mitis** (Bartl.) *Canthium mite* Bartl. in DC. Prodr. **4** (1830) 474.

(2234 *Meyer*) December; (7020 *Elmer*) November. In thickets below 100 m. Endemic.

3. **P. umbellata** (Bartl.) K. Sch. in Engl. und Prantl. Nat. Pflanzenfam. **4** (1891) **4:** 92. *Myonima umbellata* Bartl. *Canthium villarii* Vidal. *Canthium gynochthodes* Baill.

(1807, 1808 *Borden*) September; (1452, 1456, 1459 *Ahern's collector*) July. In forests 100 to 200 m. Endemic.

Bentham and Hooker f. are frequently cited as the authority for the transfer of this species to *Plectronia*, but they only indicated and did not actually make the transfer. K. Schumann is the proper authority.

4. **Plectronia viridis** Merrill, sp. nov.

A small tree, 10 m. high or less. Branches slender, terete, glabrous, light brown or gray. Leaves opposite, glabrous, subcoriaceous, elliptical-ovate to ovate or elliptical-lanceolate, dull or slightly shining, pale green when dry, 6 to 11 cm.

long, 2 to 4 cm. wide, nerves 4 to 5 on each side of the midrib, ascending, distant, not or only obscurely anastomosing, the reticulations obsolete; petioles 5 to 8 mm. long; stipules oblong, 2 to 3 mm. long, deciduous, apex rather strongly, often caudate acuminate, the acumen blunt, the base acute or somewhat decurrent acuminate. Flowers pale green, somewhat fragrant, fasciculate, 3 to 6 in each axil, 4 to 5 mm. long, the pedicels slender, glabrous, 2 to 3 mm. long. Calyx short, broad, 5-toothed, glabrous, about 1 mm. long, 2 mm. in diameter. Corolla about 4.5 mm. long, the tube short, broad, not contracted, glabrous outside, villous within, about 2 mm. long, the lobes 5, about equaling the tube, reflexed, ovate or oblong-ovate, acute. Stamens 5; filaments villous, about 1 mm. long; anthers 1.5 mm. long. Ovary glabrous, 2-celled; style 1.5 mm. long, glabrous; stigma capitate, entire, ridged. Fruit yellow when mature, obovoid, or oblong-obovoid, glabrous, didynamous, fleshy, 1 to 1.3 cm. long, about 8 mm. in diameter, 2-seeded, the seeds narrowly oblong-ovoid, rugose, somewhat triquetrous, 8 or 9 mm. long.

(3945 *Merrill*) March, 1905 (type); (349 *Barnes*) February, 1904; (2587, 3000 *Meyer*) February, May, 1905; (731, 2560, 2751 *Borden*) May, 1904, February, March, 1905; (98, 298 *Whitford*) April, May, 1904. Abundant in forests 300 to 700 m. *Plectronia villarii* Elmer in herb., non K. Sch.

5. **P.** sp.

(1263 *Whitford*) May; (3036 *Borden*) May. In forests and thickets 80 to 130 m., material very imperfect.

16. **TIMONIUS** Rumph.

1. **T. arborea** Elmer n. sp. in herb.

A small tree 8 to 12 m. high. Leaves opposite, 7 to 16 cm. long, 2.5 to 6 cm. wide, oblong-lanceolate to broadly oblanceolate or elliptical oblanceolate, the apex acuminate, gradually narrowed below to the acute base, glabrous on both surfaces; nerves 6 to 7 on each side of the midrib, ascending, prominent beneath, the reticulations obscure, dense; petioles glabrous or very slightly pubescent, 0.5 to 1 cm. long; stipules 4 mm. long, acuminate, pubescent. Female flowers axillary, solitary, the pedicels 1.5 cm. long, pubescent. Calyx 6 mm. long, pubescent, subtended by two small bracteoles, the limb with 5 or 6 small teeth. Corolla pubescent outside, 13 mm. long, the tube cylindrical, about 9 mm. long, the lobes 6 to 8, spreading or reflexed, about 4.5 mm. long, oblong. Stamens 6 to 8, sessile, inserted on the corolla tube at about the middle, the anthers nearly 3 mm. long. Style equaling the corolla tube, glabrous, channeled, divided above into 5 or 6 linear branches. Fruit globose or ovoid, glabrous, about 1 cm. long, costate, the seeds many, subterete, more or less curved, about 7 mm. long.

(1248 *Whitford*) May, 1905; (1364 *Borden*) July, 1904; (1421 *Ahern's collector*) July, 1904. In forests 200 to 600 m. A species apparently related to *Timonius jambosella* Thwaites, differing, however, in many characters.

17. **PAVETTA** Linn.

1. **P. barnesii** Elmer n. sp. in herb.

A spreading shrub about 5 m. high. Leaves chiefly clustered at the ends of the branchlets, membranous, glabrous, turning black in drying, oblanceolate to oblong-obovate, opposite, 9 to 14 cm. long, 2.5 to 5 cm. wide, the apex usually slender acuminate, the base attenuate; nerves 7 to 9 on each side of the midrib, curved-ascending, rather prominent on both surfaces, the reticulations lax; petioles about 2 cm. long; stipules glabrous; subcoriaceous, acute, 5 mm. long, nearly as broad at the base. Inflorescence a terminal cymose panicle not exceeding the leaves, the lower branches subtended by broad bracts, glabrous or very obscurely pubescent, the pedicels slender, 1 cm. long, ebracteolate. Calyx 3 mm. long, minutely pubescent outside, the teeth 4, short. Corolla white, straight or often curved, nearly 3 cm. long, slender, glabrous on the outside, the 4 broadly linear lobes spreading, obtuse, 8 mm. long. Stamens 4, inserted on the throat of the corolla; filaments very short; anthers linear, 12 mm. long, sagittate at the base. Style slender, glabrous except for the puberulous exserted portion, 2 cm. longer than the corolla tube. Fruit 5 mm. in diameter, globose, glabrous, black and strongly wrinkled when dry.

(1369, 2037 *Borden*) July, October, 1904; (2627 *Meyer*) February, 1905; (6788 *Elmer*) November, 1904 (type). Also No. 574 *Whitford*, Sariaya, Province of Tayabas, Luzon, August, 1904.

18. IXORA Linn.

1. **I. coccinea** Linn.; Hook. f. Fl. Brit. Ind. **3** (1880) 145.

(1270 *Whitford*) May; (6118 *Leiberg*) July; (1463 *Ahern's collector*) July; (2299 *Meyer*) December. In thickets near the seashore. British India and Malaya.

2. **I. cumingiana** Vidal, Phan. Cuming. Philip. (1885) 183, ex descr.

(1473, 1487, 1490 *Ahern's collector*) July, August; (1772, 1938 *Borden*) August, October; (2242, 3015 *Meyer*) May; (3174, 3262 *Merrill*) October; (6658, 6868 *Elmer*) November; (297 *Copeland*) January; (31, 54 *Whitford*) April; (6104 *Leiberg*) July. Abundant in thickets and forests 50 to 250 m. Endemic.

The above specimens were all identified by Mr. Elmer as *Ixora barbata* Roxb., but differ from that species in the glabrous, not barbate corolla throats. The vegetative characters are very similar in both species.

3. **I. macrophylla** Bartl. in DC. Prodr. 4 (1830) 487, ex descr.

(613, 1759 *Borden*) April, August; (2611 *Meyer*) February; (6094 *Leiberg*) July; (462 *Topping*) May; (1437 *Ahern's collector*) August; (6728 *Elmer*) November; (2503, 3145 *Merrill*) June, October. Abundant in thickets and forests, ascending to 500 m. Endemic.

The above specimens were identified by Mr. Elmer as *Ixora cumingiana* Vidal, but agree more closely with the description of *I. macrophylla* Bartl.

19. WEBERA Schreb.

1. **W. luzoniensis** Vidal, Phan. Cuming. Philip. (1885) 179.

(2505, 2524, 3260 *Merrill*) June, October; (380 *Whitford*) June; (2188 *Meyer*) December; (6661 *Elmer*) November; (6160 *Leiberg*) July. In thickets and in forests along streams below 150 m., abundant. Endemic.

2. **Webera meyeri** (Elmer).

A lax shrub about 5 m. high. Branches densely hirsute pubescent. Leaves opposite, membranous, broadly oblong-lanceolate or oblanceolate, 10 to 20 cm. long, 4 to 6 cm. wide, shining above, hirsute pubescent on both surfaces with scattered hairs, the pubescence becoming dense on the midrib and lateral nerves beneath, the apex sharply acuminate, narrowed below to the acute base; nerves about 10 on each side of the midrib, ascending, somewhat prominent beneath, loosely anastomosing, the reticulations lax; petioles 1.5 to 2 cm. long, densely hirsute; bracts 1 to 1.4 cm. long, hirsute, the base broad, slenderly long caudate acuminate. Inflorescence terminal, corymbose, 2 to 3 cm. long, densely hirsute pubescent throughout, the peduncle very short, the primary branches about 1.5 cm. long, the bracts linear, about 8 mm. long. Flowers white, about 8 mm. long, subsessile, clustered at the ends of the branches. Calyx densely hirsute pubescent, 4 mm. long, 5-toothed, the teeth narrow, about as long as the tube, subtended by 2 linear, hirsute bracteoles nearly as long as the calyx. Corolla pubescent outside, the tube short, 2 mm. long, the lobes 5, imbricate, narrowly oblong, about 8 mm. long, 2 mm. wide. Stamens 5, inserted on the throat of the corolla; filaments short, flattened, glabrous; anthers 8 mm. long, linear, sagitate at the base. Ovary 2-celled, each cell 1-ovuled; style minutely pubescent below.

(2764 *Meyer*) February, 1905. In forests at 700 m. *Ixora meyeri* Elmer in herb.

20. PSYCHOTRIA Linn.

1. **Psychotria bataanensis** Elmer, n. sp. in herb.

A shrub 1 to 2 m. high, the branches gray or brown, glabrous, the younger parts rather densely dark brown pubescent. Leaves oblong-obovate, opposite the apex rounded, strongly narrowed below to the narrowly subtruncate somewhat cordate or auriculate base, 7 to 13 cm. long, 2.5 to 6 cm. wide, brownish when dry, glabrous and somewhat shining above, pubescent or puberulent on the nerves beneath, subcoriaceous; nerves very prominent beneath, about 20 on each side of the midrib, parallel, slightly curved upwards, anastomosing near the margin, the reticulations not prominent; petioles 1.5 to 2.5 cm. long, pubescent; stipules subglabrous, rigid, acute, deciduous, about 8 mm. long. Inflorescence terminal, dense, about 1 cm. long in anthesis, 2 to 3 cm. long in infrutescence, the branches densely brown pubescent. Flowers white. Calyx pubescent, turbinate, 3 mm. long, somewhat obscurely 4-toothed. Corolla glabrous except the pilose throat, subcampanulate, the segments 4, obtuse, thick. Stamens 4; filaments about 1 mm. long, glabrous; anthers 1 mm. long, broad; style short, glabrous; fruit red, 2-celled obovoid, about 6 mm. long, 4 mm. in diameter, obscurely ridged, somewhat pubescent, clustered at the ends of the 1 to 1.5 cm. long peduncles; pyrenes one in each cell, the base pointed, the apex rounded, the ventral surface flat, the dorsal surface 3 to 5 ridged.

(3180, 3765 *Merrill*) October, January; (214 *Whitford*) May; (2078 *Borden*) November; (1508 *Ahern's collector*) July; (6980 *Elmer*) November. On exposed ridges in the mossy forest 700 to 1,100 m.

2. **Psychotria diffusa** Merrill, sp. nov.

Subscandent. Branches dark brown, glabrous, striate, shining, the younger parts with few scattered more or less crisped hairs. Leaves ovate-lanceolate, glabrous, or the younger ones with few crisped hairs on the midrib beneath, 4 to 9 cm. long, 1 to 3.5 cm. wide, long acuminate, the base acute, submembranous, somewhat shining; nerves about 6 on each side of the midrib, somewhat prominent beneath, the reticulations lax; petioles slender, about 5 mm. long; stipules broad, membranous, deciduous, 5 to 8 mm. long. Inflorescence terminal, lax, spreading, 15 cm. long or often very much shorter, the axis and branches with few crisped hairs, becoming glabrous or nearly so, the latter slender, spreading or ascending, subtended by small ovate bracts. Flowers small, greenish, fragrant. Sessile or short pediceled in clusters of threes at the ends of the ultimate branchlets, subtended by small bracteoles. Calyx glabrous, 2 mm. long, with 5 small teeth. Corolla about 1.3 mm. long, glabrous outside, tubular, cleft to about the middle into 5 acute lobes. Stamens 5, the anthers less than 0.5 mm. long. Ovary 2-celled, each cell 1-ovuled; style glabrous about 1 mm. long, slightly thickened above, the stigma slightly bilobed. Fruit narrowly obovoid, white when mature, glabrous, 3 to 4 mm. long, 2-celled, each cell 1-seeded, or by abortion 1-celled and 1-seeded; seed flattened on the ventral surface, convex on the dorsal surface, slightly rugose, not or very obscurely 2 to 3 ridged.

(152, 1187, 1208 *Whitford*) May, March; (6811 *Elmer*) November. Also No. 6258 *Elmer*, Sablan, Province of Benguet, Luzon, April, 1904, and No. 930 *Whitford*, Mount Banahao, Province of Tayabas, Luzon, October, 1904. On exposed ridges in the mossy forest above 1,100 m. Identified by Mr. Elmer in herb. as *Psychotria celastroides* Griseb., a West Indian species.

3. **Psychotria rubiginosa** Elmer, n. sp. in herb.

A shrub 2 to 5 m. high, the branchlets rather stout, densely dark brown pubescent. Leaves oblong lanceolate to oblong or elliptical oblanceolate, 20 to 30 cm. long, 5 to 9 cm. wide, subcoriaceous, reddish brown when dry, glabrous and shining above, rather densely uniformly papillose pubescent beneath, the apex short, sharp, usually abruptly acuminate, gradually narrowed below to the acute base, the margins recurved; nerves 14 to 17 on each side of the midrib, prominent beneath, parallel, slightly curved upwards, anastomosing, the reticulations very lax, petioles stout, about 2 cm. long, glabrous above, densely pubescent beneath; stipules ovate, about 1 cm. long, coriaceous, pubescent, the apex usually with two short slender teeth. Inflorescence terminal, about 15 cm. long, the peduncle 6 to 9 cm. long, the panicle ovate in outline 7 to 8 cm. wide, the branches spreading, densely rufous pubescent, the branches subtended by short persistent bracts. Flowers white, fragrant, sessile in clusters of threes at the tips of the branchlets, each subtended by a small bracteole. Calyx glabrous or very slightly pubescent, about 2 mm. long, its rim with 5 shallow teeth. Corolla 2 to 3 mm. long, glabrous on the outside, cleft into 5 oblong obtuse segments. Stamens 5, the filaments glabrous, 1 mm. long; anthers about 1 mm. long. Style not exceeding the corolla, the stigma bifid. Fruit 2-celled, each cell 1-seeded, obovoid, nearly 1 cm. long, orange red when mature, glabrous, shining, black and somewhat wrinkled when dry; seeds flat on the ventral, convex on the dorsal surface, glabrous, not ridged.

(2778 *Meyer*) February; (243 *Whitford*) May; (6718 *Elmer*) November. On ridges and in ravines, forests 600 to 900 m.

4. **P. tacpo** (Blanco) Rolfe, Journ. Linn. Soc. Bot. **21** (1884) 312.

(2319 *Meyer*) January; (1951, 2360 *Borden*) October, January; (6008 *Leiberg*) July. In thickets below 50 m. Endemic.

5. **P. manillensis** Bartl. in DC. Prodr. **4** (1830) 522. (?)

(1480 *Ahern's collector*) July; (1771 *Borden*) August; (6758 *Elmer*) November; (479, 510 *Whitford*) July; (5008 *Leiberg*) July. In forests 100 to 400 m. Endemic.

Bartlings description is too short to warrant absolute identification, the specimens here referred to his species strongly resembling *Psychotria tacpo*, differing however in the fewer nerved leaves and slightly fimbriate-ciliate margins of the bracteoles and calyx teeth. These specimens were identified by Mr. Elmer as *Psychotria philippinensis* C. et S., but that species has axillary, not terminal, peduncles.

6. **P. sarmentosa** Blume; Hook. f. Fl. Brit. Ind. **3** (1880) 165.

(3253, 3887 *Merrill*) October, August; (135, 253 *Whitford*) May. In forests 600 to 800 m. British India and Malaya.

21. GEOPHILA D. Don.

1. **G. herbacea** (Linn.) K. Sch. *G. reniformis* Don.; Hook. f. Fl. Brit. Ind. **3** (1880) 178.

(*Whitford*). On rocks in river cañon. Widely distributed in the Tropics.

22. LASIANTHUS Blume.

1. **Lasianthus bordenii** Elmer, n. sp. in herb.

A shrub about 2 m. high, the branches rather densely pubescent with long, spreading, fulvous hairs. Leaves oblong-ovate, distichous, 2 to 2.5 cm. apart, 4 to 6 cm. long, 1 to 3 cm. wide, membranous, the apex short sharp acuminate, the base inequilateral, rather abruptly subtruncate-rounded, often more or less cordate, glabrous and shining above, paler and shining beneath, the nerves and midrib densely pubescent with long fulvous hairs, the reticulations with few scattered hairs; nerves very prominent beneath, curved upwards, about 8 on each side of the midrib, the reticulations also rather prominent; petioles densely fulvous pilose, 2 mm. long or less; stipules densely fulvous pilose, laciniately divided into 5 to 8 linear segments about 5 mm. long. Flowers sessile, minute, 1 to 3 in each leaf axil, completely surrounded by the laciniate, pubescent bracts. Fruit light blue, fœtid, subglobose, about 5 mm. in diameter, crowned by the very short calyx teeth; pyrenes 4, triquetrous, 2 mm. long, 1 mm. thick, rounded at the apex, the base somewhat pointed.

(2088 *Borden*) November; (6997 *Elmer*) November. On exposed ridges in the mossy forest at about 1,050 m.

2. **Lasianthus obliquinervis** Merrill, sp. nov.

A shrub 2 to 5 m. high. Branches dark brown or nearly black when dry, puberulent. Leaves oblong-lanceolate to lanceolate, subcoriaceous, 10 to 16 cm. long, 2 to 4 cm. wide, glabrous and shining above, beneath pubescent on the nerves and midrib the apex sharply acute or acuminate, the base somewhat inequilateral, rather abruptly acute; nerves 5 to 6 on each side of the midrib, curved, strongly ascending, prominent beneath, the reticulations subparallel; petioles pubescent, 1 to 1.5 cm. long; stipules oblong-ovate acute or acuminate, pubescent, about 5 mm. long, caducous. Flowers white, fascicled, 3 to 5 or 6 in each axil, ebracteate. Calyx pubescent, 3 to 4 mm. long, funnel-shaped, 5 to 6 toothed, the teeth triangular, acute, about 1 mm. long. Corolla more or less pubescent, 1 cm. long, the tube about 6 mm. long, 5-lobed, the lobes oblong, acute, pubescent on both surfaces, about 4 mm. long. Stamens 5, the anthers sessile, included, about 1.5 mm. long. Style about 5 mm. long, glabrous. Fruit blue, foetid, subglobose, somewhat pubescent, 6 or 7 mm. in diameter, each with about 6 triquetrous, pyrenes about 4 mm. long.

(247 *Whitford*) May; (1584, 2086 *Borden*) August, November; (2212 *Meyer*) December; (6802 *Elmer*) November; (3296, 3763 *Merrill*) October, January; (6050, 6055, 6157 *Leiberg*) July. In forests and on exposed ridges 800 to 1,200 m., abundant. Identified by Mr. Elmer in herb. as *Lasianthus lucidus* Blume.

3. **L.** sp.

(209, 319 *Whitford*) May; (1580 *Borden*) August; (3770, 3893 *Merrill*) January, August. With the preceding. *Lasianthus lucidus* Elmer in herb., in part, non Blume.

4. **L.** sp. (?)

(6837 *Elmer*) November; (2084 *Borden*) November. In forests at 800 m. Identified by Mr. Elmer as *Lasianthus lævigatus* Blume, but the fruit with two pyrenes. Specimens in fruit only.

23. **AMARACARPUS** Blume.

1. **A. pubescens** Blume; Miq. Fl. Ind. Bat. **2** (1856) 304.

(2837 *Meyer*) March; (1193 *Whitford*) March; (3194 *Merrill*) October; (6975 *Elmer*) November. On exposed ridges in the mossy forest above 1,200 m. Java.

24. **MYRMECODIA** Jack.

1. **M. echinata** Gaud.; Beccari, Malesia **2** (1884) 113. *t. 32. f. 4–9.*

(*Merrill*) January; (1144 *Whitford*) March. Epihpytic, mossy forest on exposed ridges 900 to 1,000 m.

From the material available I am unable to separate this form from Gaudichaud's species which is known from the Islands of Aru and Rawak of the Malayan Archipelago.

25. **MORINDA** Linn.

1. **M. citrifolia** Linn., var. **bracteata** (Roxb.) Hook. f. Fl. Brit. Ind. **3** (1880) 156.

(96, 432 *Whitford*) April, June. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya. T., *Lino*.

2. **Morinda volubilis** (Blanco). *Coffea volubilis* Blanco Fl. Filip. ed. 1 (1837) 157; ed. 2 (1845) 111; ed. 3, 1 (1877) 200.

Scandent, reaching a height of 15 m. Branches glabrous. Leaves coriaceous, glabrous, in whorls of threes, rarely opposite, ovate to oblong, 7 to 13 cm. long, 4 to 7 cm. wide, the apex short sharp acuminate, the base acute; nerves 4 to 5 on each side of the midrib, somewhat prominent, glandular in the axils beneath, the reticulations lax; petioles 1.5 to 4 cm. long, glabrous. Inflorescence axillary, paniculate or sometimes subumbellate, 6 to 12 cm. long, the peduncles stout, angular, glabrous, the branches spreading. Flowers white, fragrant, in capitate heads of from 3 to 7 flowers each, at the tips of the 2 to 3 cm. long branches. Calyces glabrous, fleshy, united to above the middle, the rim short, entire. Corolla about 1 cm. long, glabrous throughout, tubular, usually 5-cleft but sometimes 8 or 9 cleft, the lobes thick, linear, about 6 mm. long, 1 mm. wide. Stamens 5 to 9; anthers narrowly oblong, 6 mm. long. Ovary spuriously 4-celled, each cell with a single ovule. Fruit (immature) subglobose, fleshy, 1 cm. in diameter, black when dry.

(2290 *Meyer*) December; (1763 *Borden*) August. In forests 100 to 130 m.

An apparently distinct species to which Blanco's description of *Coffea volubilis* rather closely applies, his specific name being accordingly adopted and the species redescribed under *Morinda*. Blanco's species was referred by F.-Villar to *Morinda umbellata* Linn., to which the description of *Coffea volubilis* manifestly does not apply. *Lucinaea odorata* Elmer, in herb.

CAPRIFOLIACEÆ.

1. **SAMBUCUS** Linn.

1. **S. javanica** Blume; Clarke in Hook. f. Fl. Brit. Ind. **3** (1880) 2.

(490 *Whitford*) July; (2917 *Borden*) March. In thickets along the river 200 to 300 m. British India to China, Japan, and Malaya.

2. **VIBURNUM** Linn.

1. **V. odoratissimum** Ker; Clarke l. c. 7.

(1512 *Ahern's collector*) August; (6981 *Elmer*) November. In forests above 700 m. British India to Burma and China.

2. **V. sinuatum** Merr. Govt. Lab. Publ. **35** (1906) 65.

(6904 *Elmer*) November; (2618 *Meyer*) February; (3875, 3946 *Merrill*) August, March; (120 *Whitford*) May. On exposed ridges in the mossy forests above 1,000 m. Endemic.

CAMPANULATÆ.

CUCURBITACEÆ.

1. **MELOTHRIA** Linn.

1. **M. mucronata** (Blume) Cogn. in DC. Monog. Phan. **3** (1881) 608.

(3086 *Merrill*) October; (2032 *Borden*) October. In thickets below 100 m. Tropical Asia and Malaya.

2. **MOMORDICA** Linn.

1. **M. charantia** Linn.; Cogn. l. c. 436.

(1947 *Borden*) October; (7016 *Elmer*) November. In open waste places and cultivated grounds. Tropics generally. T., *Ampalaya.*

3. **TRICHOSANTHES** Linn.

1. **T. cucumerina** Linn.; Cogn. l. c. 357.

(3309 *Merrill*) October; (1949 *Borden*) October. In thickets near the seashore. Tropical Asia, Malaya, and Australia.

2. **T. quinquangulata** A. Gray; Cogn. l. c. 378.

(*Merrill*). In thickets along the river below 100 m. Endemic.

Cogniaux apparently was unable definitely to locate the origin of this species, as he cites "In ins. Mangsi 'in the Sooloo Sea' (sec. Asa Gray)." Mangsi Island, or rather islands, written on modern maps "Mangsee," are two small islets in the western extremity of the Sulu or Jolo Sea, in the Balabac Strait between the Islands of Balabac and Borneo, and politically at least belong to the Philippine Archipelago.

4. **LUFFA** Linn.

1. **L. cylindrica** (Linn.) Roem.; Cogn. l. c. 456.

(2034 *Borden*) October; (7019 *Elmer*) November. In thickets below 100 m., widely distributed in the Philippines. Tropics generally.

5. **GYNOSTEMMA** Blume.

1. **G. integrifoliola** Cogn. l. c. 917.

(2425 *Meyer*) January; (6694 *Elmer*) November. In thickets below 100 m. Endemic.

COMPOSITÆ.

1. **CENTRATHERUM** Cass.

1. **C. fruticosum** Vid. Rev. Pl. Vacs. Filip. (1886) 159.

(*Whitford*). On exposed ridges in the mossy forest. Endemic.

2. **VERNONIA** Schreb.

1. **V. arborea** (Wall.) Ham.; Hook. f. Fl. Brit. Ind. **3** (1881) 239.

(3200 *Merrill*) October; (6695 *Elmer*) November. On exposed ridges in the mossy forest above 1,200 m. Tropical Asia and Malaya.

2. **V. chinensis** (Lam.) Less.; Hook. f. l. c. 235.

(*Whitford*) April. A weed in waste places below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya.

3. **V. cinerea** (Linn.) Less.; f. l. c. 233.

(*Merrill*). In thickets and open places below 100 m. With the preceding, extending to Africa and Australia.

4. **V. vidalii** Merr. Govt. Lab. Publ. **6** (1904) 6.

(1278 *Borden*) July. In thickets below 100 m. Endemic.

3. **ELEPHANTOPUS** Linn.

1. **E. mollis** H. B. K.; DC. Prodr. **5** (1836) 86.

(*Whitford*) April. In thickets and waste places below 100 m., widely distributed in the Philippines, introduced from tropical America.

2. **E. scaber** Linn.; Hook. f. l. c. 242.
(*Merrill*). With the preceding. Tropics generally, probably native of tropical America.

3. **E. spicatus** Juss. *Distreptus spicatus* Cass.; DC. l. c. 87.
(*Merrill*). With the preceding introduced from tropical America.

4. ADENOSTEMMA Forst.

1. **A. viscosum** Forst.; Hook. f. l. c. 242.
(2229 *Meyer*) December; (3774 *Merrill*) January. Along open trails in forests at 100 m., widely distributed in the Philippines. Tropics generally.

5. AGERATUM Linn.

1. **A. conyzoides** Linn.; Hook. f. l. c. 243.
(*Whitford*) April; (1822 *Borden*) September. In thickets and waste places below 100 m., widely distributed in the Philippines. Tropics generally, probably a native of tropical America.

6. MIKANIA Willd.

1. **M. scandens** (Linn.) Willd.; Hook. f. l. c. 244.
(2504 *Meyer*) January. In forests at 100 m. Tropical Asia and Malaya.

7. CONYZA Less.

1. **C. viscidula** Wall.; Hook. f. l. c. 258.
(1608 *Borden*) August; (*Whitford*) May. In open places and thickets below 100 m. Tropical Asia to Malaya and Australia.

8. BLUMEA DC.

1. **B. lacera** DC.; Hook. f. l. c. 263.
(465 *Whitford*) July. On recently burned ground above 1,200 m., dwarfed form. Tropical Asia, Africa, and Malaya.

2. **B. balsamifera** (Linn.) DC.; Hook. f. l. c. 270.
(36 *Whitford*) April. In thickets below 100 m., widely distributed in the Philippines. Tropical Asia and Malaya. T., *Sambong*.

9. WEDELIA Jacq.

1. **W. biflora** (Linn.) DC.; Hook. f. l. c. 306.
(2294 *Meyer*) December; (6847 *Elmer*) November; (1953, 2017 *Borden*) October; (*Whitford*) April. In thickets bordering the seashore. Tropical shores of Asia and Malaya.

10. EMILIA Cass.

1. **E. flammea** Cass.; Hook. f. l. c. 336.
(6668, 6999 *Elmer*) November; (2116 *Borden*) November; (2175 *Meyer*) December; (3944 *Merrill*) March. Along streams at 100 m., and on exposed ridges above 1,200 m., probably a native of the Philippines, now also found in tropical Asia.

2. **E. sonchifolia** (Linn.) DC.; Hook. f. l. c. 336.
(3282 *Merrill*) October; (*Whitford*) June. In thickets below 100 m., and on bluffs along the seashore. Tropical Asia and Africa.

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THE PHILIPPINE
JOURNAL OF SCIENCE

VOL. I JUNE 15, 1906 SUPPLEMENT II

NEW PHILIPPINE FERNS.

By EDWIN BINGHAM COPELAND.
(From the Bureau of Education, Manila, P. I.)

The ferns herein described as new, or reported as additions to the Philippine flora, have, almost without exception, been collected since the preparation of the Polypodiaceæ of the Philippine Islands.[1] Many more probably, but not yet certainly, new species are held for further study; of a number of other new species the material collected is inadequate for good descriptions. The new species are represented in the herbarium of the Bureau of Science and in that of the author. It is a pleasure to acknowledge valuable assistance from Dr. Christ, of Basel, Switzerland. No additions to *Nephrodium* are reported here, as our collections of this great genus are being worked over by Christ for publication in the near future.

ALSOPHILA Br.

Alsophila clementis Copeland n. sp.

Caudice valido usque ad 9 m. alto; pede stipitis paleis albido-fulvis linearibus 5–15 mm. longis vestito; stipite fusco, sursum rhachique interdum stramineis, spinis validis acutis subatris crebris 4–5 mm. longis exasperato; rhachi glabra, spinis minoribus horrida; fronde 100–150 cm. longa, ovata, tripinnatifida; pinnis medialibus 30–40 cm. longis, rhachibus asperis; pinnulis 6–7 cm. longis, 15 mm. latis, in segmentis subfalcatis integris fere and costam nudam incisis, coriaceis, ubique glabris, supra atro-viridis, infra pallidis interdum subglaucis; venulis furcatis; soris nudis.

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[1] *Bureau of Government Laboratories, Publ.* **28** (1905), July.

MINDANAO, Lanao, Camp Keithley, 800 m. s. m., *Clemens* 112.

Near *A. contaminans* Wall., but different in the numerous, dark, stout spines and small frond; distinguished from *A. latebrosa* Hk., by the absence of scales among the sori.

CYATHEA Sm.

Cyathea caudata (J. Sm.) Copeland. (*Alsophila caudata* J. Sm. in Hooker's Journal of Botany **3** (1841) 419; Species Filicum **9**: 52.) Indusium membranous, disappearing completely.

LUZON, *Cuming* 267; Province of Benguet, Baguio, *Elmer* 5867; Province of Bataan, Mount Mariveles, *Whitford* 320, *Merrill* 3195, *Elmer* 6809, *Topping* 366.

Cuming's plant was distinguished by Hooker chiefly by the long-caudate tips of the pinnules; in this respect, none of our plants are equally conspicuous, though the tendency is evident. It is variable also in the serrateness of the segments. I am altogether unable to distinguish the specimens with an indusium from those which have lost it.

Cyathea christii Copeland n. sp.

Caudice 3–4 m. alto, 7 cm. crasso, apice basibusque stipitum paleis duris sordidis brunneis setaceis 15 mm. longis vestitis; stipitibus indumento minuto deciduo vestitis, aculeis sparsis 1–2 mm. longis asperatis; fronde 1.5–2 m. longa, tripinnatifida; rhachi infra glabrescente subaspera, supra fusca brevi-pubescente; pinnis infimis diminutis deflexis, medialibus horizontalibus, 50 cm. longis, 12–14 cm. latis, acuminatis; pinnulis 7 cm. longis, 15 mm. latis, serrato-caudatis, fere ad costam in segmentis lineari-oblongis denticulatis satis remotis plerumque obtusis divisis, venis infra sparsim et minute paleaceis, aliter glabris, tenuicoriaceis, supra atro-viridibus, infra pallidis; venulis fertilibus furcatis, sterilibus furcatis vel simplicibus; soris costalibus; indusiis fragilibus.

MINDANAO, Davao, Monte Apo, 1,800 m. s. m., *Copeland* 1141.

A relative of *C. caudata* (J. Sm.) Copel., and of *C. spinulosa* Wallich, more delicate in form than either, and rather more pubescent.

In the same locality is another new species distinguished by bearing large, thin paleæ on the midribs of the pinnules. The material at hand, *De Vore* and *Hoover* 326, is not sufficient for a good description.

TRICHOMANES Sm.

Trichomanes merrillii Copeland n. sp.

Rhizomate erecto, valido; stipitibus confertis, 10–15 cm. altis, 1.5 mm. crassis, pilis rigidis atro-rubis 1–2 mm. longis vestitis; fronde 15–20 cm. alta, 5–6 cm. lata, acuta, bipinnata; rhachi tereta, pilosa; pinnis patenti-horizontalibus, 3–3.5 cm. longis, 7 mm. latis, obtusis; pinnulis acroscopicis majoribus, 9 mm. longis, 5 mm. latis, in segmentis setaceis profunde dissectis, glabris, coriaceis, atro-viridibus; urceolis supra axillas segmentorum acroscopicorum pinnarum, deflexis, biangulatis, limbis paullo dilatatis, receptaculis exsertis 5 mm. longis. (Tab. 1.)

PALAWAN, Puerto Princesa, 500 m. s. m., *Merrill* 716.

A plant with quite the aspect of *T. javanicum,* but much more dissected.

ACROPHORUS Presl.

Acrophorus stipellatus (Wall.) Moore. (*A. nodosus* (Bl.) Presl.)

MINDANAO, Province of Davao, Mount Apo, *Copeland* 1461. LUZON, Province of Lepanto, Mount Data, *Copeland* 1870. The indusium is often indistinguishable from that of *Nephrodium*.

India and Malaya.

POLYSTICHUM Roth.

Polystichum blepharistegium Copeland n. sp.

Stipitibus confertis, 25–40 cm. altis, supra canaliculatis, paleis brunneis polymorphis usque ad 13 mm. longis vestitis; fronde 40 cm. alta, 25 cm. lata, acuminata, bipinnata; rhachibus pilis squamulisque angustis pallido-fulvis dense sericeis; pinnis infimis deflexis vix diminutis, sequentibus horizontalibus, 13 cm. longis, 20–25 mm. latis, acuminatis; pinnulis infimis acroscopicis fere ad costam pinnatis, aliis leviter vel haud incisis, obscure serratis dentibus plerumque brevi-setiferis, late auriculatis auriculisque imbricatis, papyraceis, infra pilis stellatis fulvis pubescentibus, supra fere glabris; indusiis albidis sericeis ciliatis.

LUZON, Benguet, Ambuklao, 750 m. s. m., *Copeland* 1826.

A handsome species of the *aculeatum* group, notable for its long, narrow pinnæ and silky rachis, as well as for its indusia.

Polystichum nudum Copeland n. sp.

Rhizomate adscendente, paleis linearibus 2 cm. longis brunneis vestito; stipitibus confertis, 40–50 cm. altis, paleis brunneis deorsum plerumque ovatis 1–2 cm. longis sursum plerumque minoribus pallidioribus crinitis onustis; fronde ca. 70 cm. alta, 30 cm. lata, tripinnatifida; rhachibus paleis brunneis crinitis satis uniformibus vestitis; pinnis confertis, horizontali-patentibus, 15–18 cm. longis, 25 mm. latis, acuminatis, infimis paullo minoribus; pinnulis oblongis, acutis, auriculis brevibus fere distinctis non imbricatis, aliter inciso-serratis dentibus aculeatis, herbaceis, supra glabris viridibus, infra pallidis, venis squamulis albis vestitis; soris omnino nudis.

MINDANAO, Zamboanga, San Ramon, 1,200 m. s. m. Ad terram, *Copeland* 1744.

A species of the *aculeatum* group, quite distinct from our other representatives in aspect as well as in the naked sori.

ASPIDIUM Sw.

Aspidium polymorphum Wall.

MINDANAO, Davao, Sibulan, *Copeland* 1466. LUZON, Province of Laguna, Mount Maquiling, *Copeland* 2024.

India and Malaya.

Aspidium angulatum J. Sm.

MINDANAO, San Ramon, *Copeland* 1776.

Malaya.

A. siifolium (Willd.) Mett. is certainly exindusiate.

STENOSEMIA Presl.

Stenosemia pinnata Copeland n. sp.

Caudice erecta, valida; stipitibus caespitosis, atro-fuscis vel sursum flavescentibus, paleas paucas distantes deciduas ferentibus, frondium sterilium 25 cm. fertilium 40 cm. altis; fronde sterile deltoideo-ovata, 30 cm. alta, 20 cm. lata, pinnata; pinnis infimis stipitatis, subfalcatis, acuminatis, ovatis, 2/3 ad costam pinnatifidis, segmentis basiscopicis majoribus serratis, stipitem versus diminutis, sinubus setis minutis obstructis; pinnis sequentibus sessilibus, dein adnatis, decurrentibus, demum in apicem compositam coadunatis, membranaceis, fere glabris; rhachi dense brevi-pubescente; fronde fertile forma eadem, 10 cm. alta, bipinnata.

MINDANAO, Zamboanga, San Ramon, *Copeland* 1601. Ad terram in silvis, alt. 100 m.

This species grows associated with *S. aurita* Presl. The basal pinnæ are but little larger than the succeeding and the longest basiscopic lobes are one-third of the way to the tip. Three or four pairs of pinnæ are free. *S. aurita* in this locality has its upper surface sparsely but uniformly hirsute.

LEPTOCHILUS Kaulf.

Leptochilus hydrophyllus Copeland n. sp.

Rhizomate brevi-repente, 1–1.5 mm. crasso, apicem versus paleis fuscis, angustis, 1 mm. longis vestito; stipite frondis sterilis circa 1 cm. alto, subsquamoso, frondis fertilis 4–7 cm. alto; fronde sterile plerumque 10 cm. alta, 10 mm. lata, integra, rarius 20 cm. alta et undulata, acuta, basi subacuta, viva carnosula, sicca papyracea, glaberrima; venis immersis, inconspicuis, marginem vix attingentibus, venulis more L. cuspidati anastomosantibus, liberis inclusis paucis; fronde fertile lineare, ca. 7 cm. lata, 3 mm. lata, obtusa, in stipitem sensim angustata.

MINDANAO, Zamboanga, San Ramon, *Copeland* 1565. Ad saxa humida.

Well distinguished by the combination of the venation of *Heteroneuron* (as *L. cuspidatus*) and the narrow fertile frond of typical *Leptochilus* (as *L. decurrens* Bl.); the texture and the rather abruptly contracted sterile fronds are also peculiar.

NEPHROLEPIS Schott.

Nephrolepis glabra Copeland n. sp.

Species Nephrolepide cordifolia, qua stipite rhachique alata glabriusculis vel glabris, pinnis fertilibus crenato-serratis, venulis manifestis, textura herbacea staturaque minore differt, segreganda. Fronde 7–15 cm. vel rarius ultra, alta, lanceolata, more Muscorum Hymenophyllacearumque desiccante, pinnis vix deciduis.

LUZON, Benguet, Baguio, *Copeland* 1819. Plerumque ad saxa, sub Pinis.

Judged by the formation of tubers, and by the shape of the indusium and position of the sorus, this would be *N. cordifolia* (L.) Presl, a species common throughout the Philippines. In a genus of xerophytes, epiphytic or inhabiting dry copses, this species is notable for its exposure to extremes of moisture.

Instead of resisting desiccation, as do all the other species, this one yields readily, and endures it, without losing its pinnæ, and promptly recovers. Accordingly, it is the only one to dry readily in the press. It is probable that several distinct plants are still grouped under *N. cordifolia*.

Nephrolepis acutifolia (Desv.) Christ.

MINDANAO, Cotabato, in mangroves, *Copeland* 1413; Surigao, *Bolster*.

Africa, Malaya, Australia.

HUMATA Cav.

Humata immersa Mett. var. **nana** Copel. n. var.

Stipitibus 5–10 cm. altis, filiformibus; fronde 5–10 cm. alta, bipinnata, pinnis obtusis, pinnulis rotundatis, soris grandibus.

LUZON, Benguet, Baguio, *Copeland* 1830. Ad saxa sub Pinis.

Elmer 6604 is intermediate between this apparently rather stable dwarf and the type.

Humata parvula (Wall.) J. Sm.

MINDANAO, San Ramon, *Copeland* 1665.

Malaya.

DAVALLIA Sm.

Davallia brevipes Copeland n. sp.

Rhizomate repente, paleis lanceolatis 6 mm. longis, fuscis, apicibus marginibusque albidis, appressis densissime obtecto; stipitibus remotis, ca. 17 mm. altis, glabris, anguste alatis; fronde deltoidea, 10 cm. alta, 6 cm. lata, quadripinnata; rhachibus supra furcato-alatis, glabris; pinnis infimis paulo deflexis, late ovatis, falcatis; superioribus adscendentibus, plerumque rectis, anguste ovatis, obliquis; pinnulis minutis, cuneatis, ad costas in segmentis angustissimis, longosubulatis, coriaceis, glabris divisis; pseudo-venis nullis; soris hemicylindraceis, marginalibus, utrobique cornu longo. (Tab. 2.)

MINDANAO, Zamboanga, San Ramon, *Copeland* 1662. In coronis arborium, alt. 500 m.

In all respects a most distinct species. Owing to its inaccessible habitat it is not often seen, and on fallen boughs is rarely fertile. The hair-like tips of the numerous segments give it an almost hirsute appearance. The segments curl upward very promptly with loss of water.

Davallia embolostegia Copeland n. sp.

Rhizomate ca. 7 mm. crasso, paleis ferrugineis brunnescentibus linearibus 8 mm. longis dense vestito; stipitibus remotis, 30–50 cm. altis, validis, supra sulcatis, glabris, nitidis; fronde deltoidea, 60–100 cm. alta, acuminata, glaberrima, 4-vel 5-pinnatifida; pinnis et pinulis[1] infimis longe acuminatis, deltoideo-ovatis, superioribus angustioribus; rhachibus penultimis alatis; pinnulis ultimis oblongis vel lanceolatis, serratis vel incisis, vix coriaceis, venulis intercalatis carentibus; soribus cylindraceis marginalibus, dentibus excelsis; indusiis valde rostratis. (Tab. 3.)

LUZON, Lepanto, Bagnen, 1,900 m. s. m., *Copeland* 1914, ad truncos epiphytica; Benguet, Baguio, *Elmer* 6005; Bataan, monte Mariveles, *Merrill* 3715, *Borden* 1343; Tayabas, monte Banajao, *Whitford* 1010.

This beautiful and seemingly widespread species has been confused with *D. solida* and *D. divaricata*. It differs from the former in being larger, thinner, finer cut, with beaked indusium and teeth flanking most sori; from the latter in the narrow, marginal sori. It superficially resembles *D. elegans*, but has long sori and no false veins.

Davallia pallida Mett.

MINDANAO, San Ramon, *Copeland* 1631.

Aneitium, Borneo.

MICROLEPIA Presl.

Microlepia dennstaedtioides Copeland n. sp.

Rhizomate repente, glabro vel mox glabrescente, 3 mm. crasso; stipitibus 13–20 cm. altis, 1.5–2.5 mm. crassis, brunneis, glabris; fronde 40–60 cm. alta, 20–30 cm. lata, glabra, quadripinnatifida; pinnis lanceolatis, acutis, infimis quam sequentibus paullo minoribus, rhachibus angustissime alatis; pinnulis ovato-lanceolatis, obtusis; segmentis ultimis obovatis, integris vel dentatis, herbaceis; soris 1 mm. latis, 0.5 mm. longis, marginalibus vel saepius intramarginalibus, receptaculis tenuibus. (Tab. 4.)

MINDANAO, Davao, monte Apo, 1,800 m. s. m., *Copeland* 1475.

Remarkable for the naked rhizome, small lowest pinnæ, and often marginal sori. While the aspect suggests *Dennstaedtia*, the structure of the sorus, and the receptaculum in particular, make me believe that it is most fitly placed in *Microlepia*.

Microlepia hirta (Kaulf.) Presl.

MINDANAO, Davao, Todaya, *Copeland* 1480.

India to Polynesia.

DENNSTAEDTIA Bernh.

Dennstaedtia williamsi Copeland n. sp.

Stipitibus caespitosis, 2 m. altis, 25 mm. crassis, asperulis, subglabrescentibus; fronde ovata, 2 m. vel ultra alta, quadripinnata; pinnis 120 cm. longis, 30–35 cm. latis, acuminatis; pinnulis^{i} 4–7 cm. latis, acutis, proximis; pinnulis^{ii} confertis plerumque imbricatis, acutis, prima acroscopica maxima; pinnulis^{iii} oblongis, obtusis decurrentibus, majoribus pinnatifidis, sparsim sericeis, subcoriaceis, supra atro-viridibus, infra pallidioribus; rhachibus minute nec non dense pubescentibus, castaneis; soris in sinubus solitariis, 0.7–0.8 mm. latis.

MINDANAO, Zamboanga, San Ramon, *Copeland* 1632. Apud rivulam, 250 m. s. m.

This fern is much larger and more complex than *D. smithii* (Hk.) Moore usually is, has less difference in color between the two surfaces, and differs conspicuously in its broad, instead of almost linear, primary pinnules. This or a similar species growing in the same region at an altitude of 700 m. has fronds reaching a length, stipe included, of 7 m.

Dennstaedtia erythrorachis (Christ) Diels.

MINDANAO, San Ramon, *Copeland* 1756.

Celebes.

SCHIZOLOMA Gaud.

Schizoloma ensifolium (Sw.) J. Sm.

LUZON, District of Lepanto, Mancayan, *Copeland* 1862.

Africa to Polynesia.

LINDSAYA Dry.

Lindsaya havicei Copeland n. sp.

Rhizomate scandente, tenue, laete fusco, paleas minutas concolores caducas ferente; stipitibus remotis, 2–4 cm. altis, glabris, fuscis; fronde 12–15 cm. alta, 25 mm. lata, acuminata, pinnata, ubique glabra; rhachi straminea, gracile; pinnis brevi-stipitatis, 12–14 mm. longis, rhachin versus ubi 4 mm. altis truncatis, inde sensim ad apices acuminatas falcatas angustatis, membranaceis, marginibus acroscopicis tenuiter lobatis; venis liberis; soris minutis, terminalibus, quam altis latioribus.

MINDANAO, Zamboanga, monte Balabac, 1,300 m. s. m., *Copeland* 1758. Ad truncos muscosos.

In all respects except thickness of the lamina this is a more delicate fern than *L. merrillii;* the sori are terminal the width of the narrow segments, without any teeth projecting over them. Dedicated to the superintendent of the Government farm at San Ramon.

Lindsaya cyathicola Copeland n. sp.

Rhizomate scandente, 0.6 mm. crasso, purpureo, nitido, sparsissime fulvo-paleaceo; stipitibus remotis, 4–5 cm. altis, tenuibus, glabris, nitidis, deorsum purpureis, sursum rhachique viridescentibus; fronde 15–20 cm. alta, 15–18 mm. lata, utrinque angustata, pinnata; pinnis fere sessilibus, interdum cuneatis, majoribus 9 mm. longis, 5 mm. altis, obtusis, margine acroscopica vix ad mediam laminam bi- vel saepius trifida, glabris, membranaceis; venis nisi in soris compositis liberis; soris parvis, simplicibus vel compositis, omnibus quam altis latioribus, a margine remotis.

LUZON, Benguet, monte Bulusan, 2,100 m. s. m., *Copeland* 1938. Ad truncos Cyatheae epiphytica.

Related perhaps to *L. pulchella* Mett., but the individual fronds with more the aspect of those of *L. cultrata.*

Lindsaya montana Copeland (*L. copelandi* C. Chr.) and *Schizoloma heterophyllum* J. Sm., are forms of *L. orbiculata* (Lam.) Mett.

LOXOGRAMME Presl.

Loxogramme iridifolia (Christ) Copel. (*Gymnogramma iridifolia* Christ, Verh. Nat. Ges. Basel 2: 248. 1905.)

MINDANAO, San Ramon, *Copeland* 1629.

Celebes.

DIPLAZIUM Sw.

Diplazium tabacinum Copeland n. sp.

Rhizomate erecto, 8 mm. crasso, paleis brunneis lanceolato-subulatis 8 mm. longis vestito; stipitibus 30–40 cm. altis, 3–4 mm. crassis, supra canaliculatis, deorsum sparse paleaceis, sursum rhachibusque pedicellisque pinnarum costisque brevissime pubescentibus; fronde 30–40 cm. alta, ovata, pinnata, in alis superioribus saepe prolifera; pinnis utroque latere

2–4, lanceolato-ovatis, falcato-acuminatis, apices versus serratis, basibus cuneato-truncatis haud auriculatis, inferioribus majoribus 15 cm. longis 5 cm. latis, subcoriaceis, glabris; venis 3 vel 4–furcatis; soris linearibus, costam marginemque fere attingentibus. (Tab. 6.)

MINDANAO, Davao, Monte Apo, *Copeland* 1490 (in part).

Nearest *D. cultratum* Presl, but larger, with brown paleæ, nonauricled pinnæ, and the terminal pinna entire or with a single pair of basal lobes. *D. xiphophyllum* (Baker in *Journ. of Bot.*, 1879, p. 207), of Borneo, has numerous narrower pinnæ; my *D. palauanense* differs from it chiefly in having short sori falling far short of the margin.

Diplazium williamsi Copeland n. sp.

Caudice erecto, breve, paleis subulatis 3 mm. longis nigrescenti-fuscis coronato; stipite 4–10 cm. alto, erecto, pedi nigro paleaceo, sursum viride glabroque; fronde 10–20 cm. alta, lanceolata, acuminata, pinnata cum apice pinnatifida; rhachi tenue, glabra, viride; pinnis ca. 10-jugatis alternantibus, infimis remotis, inferioribus brevi-petiolatis, obtusis vel acutis, serratis vel incisis vel majoribus, 2 cm. longis deltoideo-lanceolatis, fere ad costam in lobis oblongis, obtusis, denticulatis partitis, basibus inaequilateralibus, acroscopice auriculato-truncatis; papyraceis, glabris, supra nitentibus, infra pallidis; venis subconspicuis, 2 ad 4-furcatis; soris elongatis, plerumque diplaziaceis. (Tab. 7.)

MINDANAO, Zamboanga, San Ramon, *Copeland* 1648. Alt. 500 m., ad terram, Feb., 1905.

In size, and in the measure of dissection of the frond, this species is very like *D. grammitoides* Presl; in color and texture it is more like *D. sylvaticum*. Fruiting fronds are found less than 5 cm. in height, including the stipe. It bears the name of R. S. Williams, of the New York Botanical Garden, my companion when it was found.

Diplazium whitfordi Copeland n. sp.

Rhizomate brevi-repente, 3 mm. crasso; stipitibus confertis, 10–20 cm. altis, pedibus nigris paleis brunneis lanceolatis caducis sparsis, sursum stramineis vel viridulis, levibus, deorsum asperis; fronde 20–35 cm. alta, 6–15 cm. lata, bipinnatifida, rhachi glabra; pinnis utroque 10–20, alternantibus, inferioribus remotioribus paulo diminutis deflexis obtusis, medialibus maximis fere horizontalibus late lanceolatis acutis, fere ad costam in segmentis oblongis 3–4 mm. latis apices versus acute serratis divisis, glabris, papyraceo-coriaceis, infra pallidis; venulis rarissime furcatis; soris utroque 4–5, costam attingentibus, a margine remotis.

LUZON, Bataan, monte Mariveles, 100 ad 700 m. s. m., *Copeland* 234, 1970, *Whitford* 1110, *Topping* 426, 394 in part.

This has the aspect of *D. williamsi*, but is larger, more cut, with brown, broader chaff, and horizontal rhizome.

Diplazium fructuosum Copeland n. sp.

Rhizomate erecto, valido; stipite ca. 1 m. alto, 10–15 mm. crasso, profunde sulcato, deorsum paleis atro-brunneis linearibus 25 mm. longis vestito, sursum glabrescente, basibus duris persistentibus palearum spinulosa; fronde 1.5–2 m. alta, 1 m. lata, bipinnata; rhachibus majoribus muricatis, minoribus levibus, fere glabris; pinnis infimis vix diminutis, 50 cm. vel ultra longis, 15 cm. latis, patentibus; pinnulis subsessilibus, lanceolatis, acuminatis, ca. 7 cm. longis, apud basim truncatum 14 mm. latis, vix ad mediam laminam in lobos integros truncatos falcatos incisis, herbaceis, glabris; venulis utrobique ca. 6, simplicibus; soris ca. 2 mm. longis, paginam totam saepe complentibus. (Tab. 8.)

MINDANAO, Zamboanga, San Ramon, *Copeland* 1699. Prope rivulas, 600 m. s. m.

Near *D. polypodioides* Bl., but much stouter, and pinnules not cut over half way to the costa.

Diplazium davaoense Copeland n. sp.

Rhizomate ignoto; stipitibus caespitosis, 70 cm. altis, 8 mm. crassis, supra valde sulcatis, fere glabris, deorsum asperulis; fronde ovata, 1–1.5 m. alta, bipinnata, sursum pinnata, demum pinnatifida, apice acuminata serrata; pinnis paucis patentibus, infimis vix diminutis, 50 cm. longis, 20–25 cm. latis; pinnulis brevi-pedicellatis, basibus truncatis, acuminatis, usque ad 14 cm. longis, 2.5–3 cm. latis, in lobos falcato-truncatos obscure denticulatos 1/3 ad costas incisis, membranaceis, glabris, nec infra pallidis; venulis utrobique ca. 6, curvatis, remotis, simplicibus; soris linearibus, 3–5 mm. longis.

MINDANAO, Davao, monte Apo, 1,800 m. s. m., *Copeland* s. n.

A quite distinct species, related to *Diplazium latifolium* and *D. cyatheæfolium.*

Diplazium dolichosorum Copeland n. sp.

Rhizomate valido, paleis linearibus 1 cm. longis atro-brunneis coronato; stipitibus confertis, ca. 35 cm. altis, 8 mm. crassis, paleis fuscis linearibus contortis 4–8 mm. longis vestitis, sursum subglabrescentibus, tum demum sparsim muricatis; fronde ovata, 1–1.5 m. alta, bipinnata, apice pinnatifida; rhachibus glabrescentibus interdum asperulis, supra canaliculatis; pinnis remotis, maximis 45 cm. longis, 20 cm. latis, infimis minoribus; pinnulis brevi-pedicellatis, ca. 10 cm. longis, 2 cm. latis, subfalcato-acuminatis, basibus truncatis, apices versus serratis, deorsum in lobos denticulatos truncatos 1/3 ad costas incisis, papyraceis, glabris, supra nitidis, infra pallidis; venulis utrobique ca. 6, simplicibus, inferioribus curvatis; soris linearibus, usque ad 8 mm. longis; indusiis laete brunneis.

MINDANAO, Zamboanga, San Ramon, 800 m. s. m., *Copeland* 1716.

This *Diplazium* is in the group of *D. latifolium* (Don) Moore. The form of the frond and of the sori suggest *D. vestitum* Presl, but the rachises are without the characteristic pubescence. Young plants with fronds still simply pinnate are sometimes fertile.

ASPLENIUM Linn.

Asplenium stantoni Copeland n. sp.

Rhizomate erecto, breve, paleis lanceolatis 2–3 mm. longis vestito; stipitibus valde confertis, 2 cm. altis, glabris, fuscis, triangularibus aciebus acutis alatisque; fronde ca. 15 cm. alta, 1 cm. lata, pinnata, glaberrima; rhachi valde trialata, haud viride; pinnis oblongis, obtusis, coriaceis, usque ad mediam frondem deflexis, infimis paullo remotis flabelliformibus; soris in pinna quaque ca. 5, paginam totam denique obtegente.

LUZON, Bontoc, Batilao, 1,600 m. s. m., *Copeland*. Ad saxa calcarea.

A clear-cut species of the *Trichomanes* group, apparently very local.

Asplenium vulcanicum Bl.

MINDANAO, San Ramon, *Copeland* 1607; Lake Lanao, Camp Keithley, *Mrs. Clemens*.

Malaya.

Asplenium horridum Kaulf.

MINDANAO, Mount Apo, *DeVore and Hoover* 319; San Ramon, *Copeland*.

Java to Hawaii.

SCOLOPENDRIUM Sm.

Triphlebia, at least in the case of *T. pinnata* (J. Sm.) Baker, is not distinguished by any constant character from *Scolopendrium*, to which genus the species should be returned.

Scolopendrium schizocarpum Copeland n. sp.

Rhizomate repente, breve, 4 cm. crasso, radices creberrimas emittente, apicem versus paleis nitido-fuscis appressis obtecto; stipite 2–3 cm. alto, atro, paleis fuscis sparsis vestito; fronde simplice, oblanceolata, 20–30 cm. alta, 3 cm. lata, caudato-acuminata, integra vel undulata, deorsum ad alas stipitis sensim diminuta, coriacea, glabra, infra pallida; venis furcatis occultis; soris obliquis, more *S. vulgaris* oppositis sed remotioribus nec vero plerumque inter se contingentibus. (Tab. 9.)

MINDANAO, Zamboanga, San Ramon, *Copeland* 1743. Ad truncos muscosos epiphytica, 750 m. s. m.

This fern differs from *S. longifolium* Presl., in having the rhizome comparatively short and stout, and covered with roots, the stipe short, the frond broader and broadest toward the apex, rather abruptly acuminate, the costa not channeled above, the veins oblique, and the opposite sori of each pair often separated by more than their own width.

BLECHNUM Linn.

Blechnum Patersoni (R. Br.) Mett.

LUZON, Province of Benguet, Pauai, *Copeland* 1944; LUZON, *Cuming* 200. Simple fronds represent *L. cumingiana* Hook.

India to New Zealand.

Blechnum patersoni var. **majus** nom. nov. (*Lomaria elongata* Bl.)

MINDANAO, Mount Apo, *Copeland* 1508.

Same range as the typical plant.

Blechnum vestitum (Blume) Kuhn.

MINDANAO, Mount Apo, *Copeland* 1511.

Java.

STENOCHLAENA J. Sm.

Stenochlaena subtrifoliata Copeland n. sp.

Rhizomate scandente, 10–15 mm. crasso, angulato, paleis fuscis lanceolatis vel ovatis 5–10 mm. longis densissime vestito; stipitibus 10–20 cm. longis, validis, deorsum perpaleaceis, sursum subglabrescentibus; fronde plantae adultae pinnata, 45–70 cm. longa, ovata; pinnis ad rhachin articulatis, superioribus sessilibus plerumque obliquis, inferioribus stipitatis, ca. 25 cm. longis, fertilibus 10 mm. sterilibus 25–30 mm. latis, acutis vel caudatis, integerrimis margine cartilaginea, coriaceis, glabris; venis omnino liberis, conspicuis; sporangiis 0.5 mm. longis, paginam totam margine costaque exceptis inferiorem complentibus.

MINDANAO, Zamboanga, San Ramon, *Copeland* 1749. Ad truncos scandente, 750 m. s. m.

The fronds of young plants are simple, a gradual change to the pinnate form occurring long before maturity. So far as "*Gymnogramme ?* (*Syngramme ?*) *subtrifoliata* Hooker" in Sp. Fil., **5**: 152, *Plate 298*, ever was described, it is indistinguishable from this *Stenochlaena*. The most similar species is *Lomariopsis spectabilis* Mett., of which the fertile pinnæ are described as narrowly linear.

PLAGIOGYRIA Kunze.

Plagiogyria christii Copeland n. sp.

Caudice erecto, breve; stipitibus confertis, 20–30 cm. altis, glabris, castaneis, nitidis, basibus incrassatis, tuberculis carentibus; frondibus 40–60 cm. altis, pinnatis; frondis sterilis pinnis utrinque ca. 13, fere horizontalibus, inferioribus brevissime pedicellatis superioribus adnatis, ca. 13 cm. longis, 15–20 cm. latis, acuminatis, serrulatis, glabris, herbaceis venis simplicibus vel furcatis; frondis fertilis pinnis utrinque 12–16, remotis, pedicellatis ver supremis adnatis, linearibus, 10 cm. longis, 2–3 mm. latis; sporis ad apices venularum confertis, primo margine membranacea inflexa protectis, dein margine retroflexa et sporangiis mox paginam totam complentibus, 0.3–0.4 mm. altis; annulis obliquis non interruptis.

MINDANAO, Zamboanga, monte Apo, *Copeland* 1509. Ad terram, 1,500 ad 1,800 m. s. m.

The fronds of this plant, both the sterile and the fertile, have altogether the aspect of those of *Stenochlaena*, and the absence of tubercles on the bases of the stipes helps to conceal its real affinity. However, the oblique annulus and the insertion of the sporangia establish its place beyond doubt.

Plagiogyria glauca (Bl.) Mett.

MINDANAO, Mount Apo, *Copeland* 1513. LUZON, Province of Benguet, Mount Bulusan, *Copeland* 1937.

Plagiogyria tuberculata Copel. n. sp.

Rhizomate erecto, breve, valido; stipitibus permultis confertis, frondium sterilium 20–35 cm., fertilium 30–40 cm. altis, rhachibusque quadratis glabris nitidis rubido-brunneis, basibus incrassatis aerophora ca. 12 ferentibus; rhachi infra insertionem pinnae tuberculum 1–1.5 mm. longum durum emittente, nec stipite eisdem minoribus remotis carente; fronde sterile ca. 60 cm. alta, 20–25 cm. lata, abrupte acuminata; pinnis 30–40-jugatis, fere horizontalibus, inferioribus brevi-pedicellatis basibus acutis, superioribus adnatis, supremis coadunatis, acuminatis apicibus rectis serratis, aliter integris, majoribus ca. 12 mm. latis, papyraceo-coriaceis, glabris; venulis simplicibus vel furcatis, conspicuis; fronde fertile angustiore, mox desiccante, pinnis ca. 11 cm. longis, 2–3 mm. latis, patentibus.

Luzon, Lepanto, Bagnen, 1,900 m. s. m., *Copeland* 1924.

Near *P. euphlebia* Mett., but larger, with more numerous and closer pinnæ, entire except near the point.

Plagiogyria pycnophylla (Presl) Mett.

Luzon, Province of Lepanto, Mount Data, *Copeland* 1854 a. Both the typical plant and the var. *remota* grow here.

Plagiogyria pycnophylla var. **mixta** Copel. n. var.

Pinnularum fertilium plerumque apicibus dilatatis sterilibus.

Luzon, Lepanto, monte Data, 2,000 m. s. m., *Copeland* 1854.

Plagiogyria stenoptera (Hance) Diels.

Luzon, Province of Lepanto, Bagnen, *Copeland* 1925.

Formosa.

ADIANTUM Linn.

Adiantum mindanaoense Copeland n. sp.

Rhizomate brevi-repente, 5 mm. crasso, radices copiosissimas emittente; stipitibus confertis, 25–40 cm. altis, deorsum paleis nitido-fuscis lineari-subulatis vestitis, sursum glabris, atro-fuscis; rhachibus infra glabris, supra pilis minutis dense pubescentibus; fronde deltoideo-ovata, 25–40 cm. alta, 20–30 cm. lata, acuminata, tripinnata; pinnulis ultimis glabris, papyraceis, brevi-pedicellatis, dimidiatis, 15–18 mm. longis, 7 mm. altis, obtusis, rhachin secus truncatis, apicibus minute dentatis, marginibus acroscopicis lente lobatis; soris in pinnula quaque ca. 6, in lobis solitariis, lobos fere complentibus, reniformi-suborbicularibus; sporangiis ad et inter venulas orsis. (Tab. 10.)

Mindanao, Zamboanga, San Ramon, *Copeland* 1734. Ad terram, 1,050 m. s. m.

Nearest *A. aneitense* Carruthers, from which it differs chiefly in the short and stout rhizome.

Adiantum spencerianum Copel. n. sp.

Rhizomate subnullo, paleis lanceolatis, 3 mm. longis; stipitibus confertis, 2–15 cm. altis, purpureo-nigris, nitidis, pedibus paleis tenuibus 2 mm. longis deciduis vestitis; fronde 7–17 cm. alta, vel longiore et radicante, 1–2.5 cm. lata, pinnata; pinnis proximis, fere sessilibus, basibus obliquis cuneatis, plerumque acutis, interdum falcatis, margine acroscopica integra vel rarius leviter incisa, recta vel vix curva, margine rhachiscopica excisa, glabra, papyracea; venulis liberis, inconspicuis; soris latis, continuis vel interruptis. (Tab. 11.)

Luzon, Benguet, Lutab, *Copeland* 1844, 1843; Adouay, *Copeland* 1832. Ad aggeres humidos, 1,000 m. s. m.

Very near the Indian *A. edgeworthii* Hooker, from which, however, it seems sufficiently different in the obscure venation and curiously cuneate bases of the usually acute pinnæ. It varies greatly according to the illumination. It bears the name of my several-times host, Rev. Irving Spencer.

SCHIZOSTEGE.

Hillebrand, Flora of the Hawaiian Islands, 1888, p. 631.

This generally unrecognized genus was founded on the character of the receptacles "which are formed by intramarginal anastomoses of two fork branches or by T-shaped expansions of simple veins." The spores are tetrahedral, and the unpolished stipes traversed each by a single U-shaped vascular strand. The fertile margin is twice the depth of the rest of the frond, making room for a spacious receptacle. The indusium is remarkably broad and scarious, and very distinct from the body of the frond. "The transition or thinning of the green frond in the involucre is quite sudden and indicated outwardly by a straight line" in the original species; in mine this line is a very evident groove, apparently making the attachment a hinge. The type of the genus, *S. lydgatei* Hillebr., was placed in *Cheilanthes* by Baker in *Synopsis Filicum*, p. 475; and in *Pteris* by Christ in *Farnkraeuter der Erde*, p. 167, and by Diels in *Nat. Pflanzenfamilien*. The affinity to *Pteris* is rather the closer, but it is a very foreign element in either genus. The vein tips are large and hyaline. When neighboring sori coalesce the anastomosis of the veins is apparently imperfect.

I am indebted to Dr. Christ for comparing my specimens with authentic *S. lydgatei*, and for sending me fragments from his specimen of this very rare fern. The sori of the Hawaiian and Mindanao plants are indistinguishable. In general aspect, *S. lydgatei* is near *Pteris quadriaurita*, while the Mindanao species approach *Cheilanthes;* they seem to differ in texture, also, but it is hard to judge this from the dried plants.

Schizostege pachysora Copeland n. sp.

Caudice erecto, breve, valido, radices ligneas emittente, paleis fuscis, lanceolatis, subulatis coronato; stipitibus confertis, 30 cm. altis, flavido-fuscis, paleis concoloribus patentibus vestitis, pedibus teretis, sursum trifurcatis; fronde 40 cm. alta, 20 cm. lata, bipinnitifida; pinnis infimis paulo deflexis, 10 cm. longis, subacutis, sessilibus, 2/3 ad costam in segmentis 5–10 mm. longis, 5–7 mm. latis, obtussisimis, integris divisis, segmento primo basiscopico producto, falcato; pinnis medialibus aequalibus, decurrentibus et plerumque confluentibus, apices versus integris; pinnis superioribus sensim diminutis in segmento apicale coadunatis; lamina glabra, carnoso-subcoriacea; venulis immersis, in seriem unam costalem alaremque, rarius in segmentis in alteram areolarum connexis; soris simplicis vel confluentibus.

MINDANAO, Zamboanga, San Ramon, *Copeland* 1715. Ad terram ripariam in montibus, alt. 700 m.

Schizostege calocarpa Copeland n. sp.

Caudice stipiteque eis S. pachysoræ similibus; fronde 35–40 cm. alta, 20 cm. lata, acuta, bipinnata; pinnis infimis oblique deltoideis; sequentibus lanceolatis, 10 cm. longis, 3 cm. latis, acuminatis, ad vel fere ad costam incisis; pinnulis patentibus, 15 mm. longis, 4 mm. latis, obtusis, decurrenti-subconnexis, crenatis vel ad costulam semiincisis, carnoso-subcoriaceis, glabris; rhachi cinerea, anguste subalata; venulis omnibus liberis; soris simplicibus; indusiis scariosis, rotundatis, latissimis. (Tab. 12.)

MINDANAO, Zamboanga, San Ramon, *Copeland* 1707. Ad terram ripariam, alt. 800 m.

Both this and the preceding species are variable, especially in the basiscopic development of the lowest pinnæ, but they do not appear to blend, though the other, usually more stable differences—in the shape of the sorus, apices of the pinnæ and anastomosing of the veins—are all dependent on the lesser dissection of the frond of *S. pachysora*. Dried specimens of both are almost papyraceous, but when fresh they are 0.5 mm. thick. The receptacle is an additional 0.5 mm. in depth.

PTERIS Linn.

Pteris pluricaudata Copeland n. sp.

Rhizomate subnullo, paleis lanceolato-setaceis cinnamomeis 1–2 mm. longis coronato; stipitibus confertis, 10–25 cm. altis, gracilibus, erectis, glabris, pedibus sparsissime setaceis, rubro-stramineis; fronde plerumque pedata, orbiculari-ovata, ca. 15 cm. longa; pinna utroque una vel in frondibus majoribus duabus, infimis furcatis, fere vel usque ad rhachin pinnatis; pinnulis proximis, linearibus, 2.5–3 mm. latis, fertilibus vix angustioribus, obtusis, sterilibus serrulatis, terminalibus valde attenuatis, papyraceis, venis conspicuis, furcatis, supra albo-setaceis, alioquin glabris; soris apices non attingentibus.

MINDANAO, Zamboanga, San Ramon, *Copeland* 1651 (type). Ad terram inter Cyatheas, 500 m. s. m. LUZON, Tayabas, Atimonan, *Whitford* 628.

In form this resembles the sterile frond of *P. grevilleana* Wall. (Cf. Clarke, *Ferns of N. India*, Trans. Linn. Soc. **1**: *Plate 54*), but it is not dimorphous, and differs further in the very evident venation, with white bristles. It is probably a local derivative of *P. quadriaurita*, which is rarely without bristles in the southern Philippines.

Pteris caesia Copeland n. sp.

Rhizomate breve, erecto, 5 mm. crasso; stipitibus caespitosis, stramineis vel brunneis, basibus paleis fuscis filiformibus 8 mm. longis densissime vestitis, sursum rhachique sub lente puberulis supra canaliculatis; fronde 20–35 cm. alta, 10–18 cm. lata, bipinnata; pinnis 1 cm. latis, acuminatis, infimis furcatis, apicalibus maximis, omnibus fere vel usque ad costam pinnatis, sinubus clausis; pinnulis ca. 1.5 mm. latis, obtusis, integris, subauriculatis, papyraceis, supra caesiis, infra pallide viridibus; costis venisque supra spinescentibus; soris angustis.

MINDANAO, Davao, prope montem Apo, *Copeland* 1515, 963. Ad rimas saxorum, 800 m. s. m.

A relative of *P. quadriaurita* Retz., distinct enough to constitute a good species. The dense, acicular, sometimes twisted basal chaff, narrow pinnæ, pinnules widened enough to overlap at the base, and very pale upper surface are prominent characters. The spine-like trichomes on the veins are more conspicuous than in any of its relatives in my possession; but such structures are present on a majority of the forms I refer to *P. quadriaurita*. Dr. Christ points out that this species is near *P. fureata* Baker, of Borneo.

VITTARIA Sm.

Vittaria alternans Copeland n. sp.

Rhizomate tenue, repente, paleis minutis subulatis purpureo-atris dense vestito; frondibus seriatis nec non confertissimis, stipitibus carentibus, 10–15 cm. altis, angustissimis, 1 mm. vel minus latis, 0.5 mm. crassis, ecostatis, vivantibus non fragilibus; soris intramarginalibus in sulcis profundis haud margine involuta protectis, interruptis; paraphysium capitibus turbinatis oleaginis; sporis reniformibus.

MINDANAO, Zamboanga, San Ramon, *Copeland* 1767, May, 1905. Ad truncos epiphytica, alt. 800 m.

This little fern has a remarkable, superficial resemblance to *Isoetes*. In the field I suspected it to be *V. lineata trichoides* Christ; but the frond is too thick to permit of any considerable folding over the sorus, and it is altogether ecostate in appearance. The groove of the sorus is 0.35 mm. deep. The spicular idioblasts of the epidermis are very numerous.

Vittaria taeniophylla Copeland n. sp.

Rhizomate repente, 2 mm. crasso, paleis lanceolatis brunneis albescentibus fere integris dense vestito; frondibus confertis, 30–35 cm. altis, 5–7 mm. latis, acuminatis, deorsum sensim ad pedes angustatis, carnoso-herbaceis, infra pallidis; costa usque ad apicem procurrente, viride, infra prominula; venulis paucis, occultis; soribus dorsalibus, superficialibus, rubidulis; paraphysibus cuculliformibus; sporis compressis, 30 x 60 μ.

LUZON, Benguet, monte Bulusan, 2,100 m. s. m., *Copeland* 1936.

A beautiful and apparently very distinct species, locally abundant. The line of the sorus, well within the margin, is practically indistinguishable on the upper surface.

ANTROPHYUM Kaulf.

Antrophyum latifolium Bl.

MINDANAO, Province of Zamboanga, San Ramon, *Copeland* 1747; Province of Davao, Mount Apo, *Copeland*.

Java, India, China.

CHRISTIOPTERIS Copel.

Christiopteris sagitta (Christ) Copel.

This species has been found fertile near where the original sterile plants were collected. LUZON, Province of Lepanto, Mount Data, *Copeland* 1905. (Tab. 13.)

PROSAPTIA Presl.

Rhizome short, clothed with ciliate paleæ; stipe short, articulate; frond pinnatifid or barely pinnate; sori terminating veinlets, immersed in the body of the frond in cavities whose openings are in or under the margin; indusium none.

A very homogeneous group of epiphytes, derived from *Polypodium;* especially intimately related to the group of *P. obliquatum*, with the species of which group they have many structural features in common—the ciliate, acuminate, dark paleæ, form and habit of frond, curling backward in drying, and deeply immersed sori. The difference is in the opening of the cavity containing the sorus—directly downward in *Polypodium*, horizontally or obliquely to the margin in *Prosaptia*. J. Smith did no violence in uniting these ferns with *Polypodium* (Hooker's Journal of Botany, 4 (1842), 46). But, for me, a genus is a group whose definition is a matter of convenience; and in dealing with so large and polymorphic a group as *Polypodium* I find it most convenient to separate a minor group as homogeneous and easily defined as this, in spite of intimate and clear affinity, rather than to stretch the definition of the larger group to include it.

Prosaptia cryptocarpa Copeland n. sp.

Rhizomate breve, subrepente, 2–3 mm. crasso, paleis atro-brunneis lanceolatis acuminatis ciliatis vestito; stipite 1–1.5 cm. alto, 1 mm. crasso, minute pubescente, pede nigro, articulato; fronde 20–35 cm. alta, 3.5–5 cm. lata, acuta vel caudata, deorsum in alam crenatam angustata, profunde pinnatifida, segmentis 2–3 mm. latis, obtusis vel acutis, sursum obscure serratis, costam versus dilatatis et ala 1–1.5 mm. lata confluentibus, coriaceis, subglabris; venis inconspicuis, venulis simplicibus; soris in segmentis majoribus 18–25, marginalibus vel submarginalibus. (Tab. 14 a, d.)

MINDANAO, Zamboanga, San Ramon, *Copeland* 1557. Super rivulam epiphytica, 200 ad 600 m. s. m.

Of the known *Prosaptiæ*, this is the most evidently and intimately related to *Polypodium*. It resembles *P. celebicum* at least as much as *P. obliquatum*, and may reasonably be regarded as descended from their not very remote common ancestor.

Prosaptia toppingii Copeland n. sp.

Rhizomate stipiteque ut P. cryptocarpæ; fronde 20–30 cm. alta, 3–4 cm. lata, acuta, ad alam 2–3 mm. latam pinnitifida, deorsum ad alam sinuatam angustata; segmentis triangulari-lanceolatis, subacutis, ca. 5 mm. latis, obtuse serratis, coriaceis, subglabrescentibus; venulis simplicibus; soris magnis, in segmentis majoribus 9, marginalibus. (Tab. 14c.)

LUZON, Bataan, monte Mariveles, *Topping* 377.

A much coarser fern than our other *Prosaptiæ*, and darker green. Two veinlets sometimes unite in an apparently simple sorus. This plant was incorrectly referred to *P. alata* (Blume) in my Polypodiaceæ of the Philippine Islands, page 53.

Prosaptia alata (Blume) Christ is intimately related to the two species just described. It has rather narrower fronds with very obtuse segments bearing few sori near their apices. (Table 14b.)

LUZON, *Cuming* 261; Province of Tayabas, *Whitford* 726.

Prosaptia contigua Presl is our remaining species. The fronds are cut nearly or quite to the rachis into usually toothed segments. It is rather common throughout the Islands.

ACROSORUS Copeland, genus novum.

Rhizomate paleis integris, basibusque stipitum confertorum vestito; frondibus linearibus, fere vel usque ad rhachin pinnatis; soro in pinna quaque uno, ad venulam apicale, sub parte pinnae retroflexa et penitus adnata immerso, ad apicem pinnae aperto.

This genus includes three plants hitherto regarded as *Prosaptiæ*, and described under *Davallia*—*D. exaltata* Copeland, *D. reineckei* Christ, and *D. frederici et* *pauli* Christ. *Polypodium binerve* Hooker, Syn. Fil. I, p. 175, may also belong here. They have a strong apparent, but merely apparent, affinity to *Prosaptia*, especially to *P. contigua monosora*, which likewise has a single apical immersed sorus in each pinna. But this position of the sorus has been attained in entirely different ways. The sorus of *P. contigua* was originally dorsal and deeply immersed; its cavity now opens toward the margin instead of dorsally. The form with single apical sori, though sometimes a feature of immature plants, is certainly derived from that with many marginal sori. The ancestors of *Acrosorus* were *Polypodia* with *superficial* dorsal sori, one on each pinna, more or less protected by the dorsal concavity of the pinna, or the folding upward and backward of its basiscopic half, as now known in *P. trichomanoides*, *P. cucullatum*, *P. streptophyllum*, and *P. gracillimum*. *Acrosorus* is unquestionably an offshoot from this group of *Polypodium*. It is related to *Prosaptia* only through the remote common ancestry of this group and that of *P. obliquatum*. Combining *Prosaptia* and *Acrosorus* would violate the most fundamental principle of systematic botany, by failing to make the classification express, as best we can, the real affinities of the plants. The remaining alternatives are the enlargement of the already cumbrous *Polypodium* to include these plants, and the establishment of a new genus. Neither *Prosaptia* nor *Acrosorus* has any near affinity to *Davallia*.

Acrosorus exaltata Copel. (Table 15.)

Davallia exaltata Copel., in Perk. Fragmenta Fl. Phil., p. 180, 1905; Polypodiaceæ of the Phil., p. 52, 1905.

Acrosorus frederici et pauli (Christ).

Davallia frederici et pauli Christ in Fil. Sarasin. II, p. 124, Tab. I; Farnflora v. Celebes, p. 94, Tab. 14, 1904, Farnkr. d. Erde, p. 306.

Polypodium frederici et pauli Christ in Farnflora v. Celebes, II, p. 37.

POLYPODIUM Linn.

Polypodium dolichosorum Copeland n. sp.

Rhizomate late repente, 1 mm. crasso, paleis fulvis amplis ovatis 2–4 mm. longis vestito; stipite duro, fusco-nigro, pilis rubidis vix 1 mm. longis vestito vel deorsum glabro, ca. 4 cm. alto, non articulato; fronde ca. 15 cm. alta, 1 cm. lata, utrinque attenuata, apice obtusa, integerrima, glabra, coriacea, opaca; venis plerumque 2-furcatis; soris obliquis, oblongis, in seriam unam inter costam marginemque instructis, costam propioribus, paulo immersis. (Tab. 16.)

MINDANAO, Davao, 1,800 m. s. m., *Copeland* 1524.

A fern related to *P. australe* Mett. and *P. caespitosum* (Blume) Mett., distinguished by the long rhizome, long, stout stipes and coriaceous fronds. Found on the ground, but probably as much at home on trees. Many of the smaller plants of the very humid forest grow indiscriminately on trees and on the ground. Not a few *Eupolypodia* in such places have nonarticulate stipes.

Polypodium decrescens Christ, Ann. Jard. Buitenz. II. 4: 35. 1904. (Tab. 17.)

LUZON, Lepanto, Bagnen, *Copeland* 1916. De truncis pendente, 1900 m. s. m. Celebes.

This species is very similar to *P. subsessile* Baker (*P. pteropus* Hooker, Sp. Fil. 4: 192, *Pl. 275*), of South America; but its pinnæ are much closer together and less dilated at the base.

Polypodium inarticulatum Copeland. (*P. lobbianum* Hooker in Species Filicum, **4**: 226, *Tab. 278 B;* non Hooker in Kew Garden Misc. **5**: 300, *Tab. 11;* Spec. Fil. **5**: 100.)

MINDANAO, San Ramon, *Copeland* 1701.

Borneo.

Polypodium pseudoarticulatum Copeland n. sp.

Rhizomate breve, repente, 2–3 mm. crasso, paleis atris ciliatis angustis 1.5 mm. longis vestito; stipitibus 2–4 cm. altis, pube horizontale vix 0.3 mm. longa vestitis, annulo conspicuo articulatis nec non saepius supra eundem fractis; fronde 10–20 cm. alta, 15–35 mm. lata, acuminata vel caudata, pinnata; rhachi nigra, brevi-pubescente; pinnis linearibus, majoribus 2 mm. latis, quam sinubus saepius angustioribus, obtusis, integris, basibus dilatatis contiguis, infimis diminutis paulo remotis vix decurrentibus, coriaceis, opacis, supra glabris, infra pube rubida plus minus decidua vestitis; venulis simplicibus, occultis; soris costae fere parallelibus, vix immersis, vix terminalibus, in pinnis maximis 22. (Tab. 18.)

LUZON, Lepanto, monte Data, *Copeland* 1855. Ad truncos muscosos, 2,200 m. s. m.

Small and narrow fronds are superficially so like *Cuming's* 398, from Luzon or Malacca, variously referred to *P. nutans* Bl. and *P. decorum* Brack., as to seem identical; however, the paleæ of the rhizome are utterly different, and this species is more pubescent. The disuse of the still prominent articulation of the stipe is a consequence of living in the mossy forest, where the ready fall of the frond is unnecessary.

Polypodium multicaudatum Copeland n. sp.

Rhizomate breve, subrepente, paleis fuscis ciliatis fere 10 mm. longis 0.5 mm. latis dense obtecto; stipitibus confertis, articulatis, ad 10 cm. altis, 1.5 mm. crassis, pilis rubido-nigris 1.5 mm. longis sparsim vestitis; frondibus 30–60 cm. altis, ad rhachin glabrum pinnatis; pinnis adscendentibus, e basibus dilatatis sensim in caudas longas attenuatis, integris, glabris, subcoriaceis, infimis ad alas diminutis; venis obliquis, simplicibus; soris saepe ad medium pinnae restrictis, utroque latere 4–10, marginem costamque fere attingentibus, immersis, cum marginibus valde crateriformibus. (Tab. 19.)

MINDANAO, Davao, monte Apo, *Copeland* 1532. Ad truncos mucosos, 1,800 m. s. m.; eodem, *Copeland* 1018 (*P. obliquatum* Copel., Polypodiaceæ of the Philippine Islands, 1905, p. 122, non Blume.)

The largest Philippine *Eupolypodium*, remarkable for its attenuate pinnæ; not uncommon locally.

Polypodium erythrotrichum Copeland n. sp.

Rhizomate breve, repente, 4 mm. crasso, paleis fuscis deciduis subciliatis 3 mm. longis vestito; stipitibus confertis, 2–5 cm. altis, 1 mm. crassis, rhachibusque pilis purpureo-rubris 1 mm. longis dense vestitis; fronde sinuato-pendente, 30–50 cm. alta, 2.5–4 cm. lata, pinnata; pinnis permultis, fere horizontalibus, ca. 2 mm. latis, rhachin versus vix dilatatis, obtusis, integris, glabrescentibus, papyraceo-herbaceis, infimis in dentes diminutis; costa sursum sinuata, venis simplicibus, obliquis, adscendentibus; soris oblongis, costae fere parallelibus, utroque latere usque ad 10, subimmersis cum marginibus prominulis. (Tab. 20.)

MINDANAO, Davao, monte Apo, *Copeland* 1527. Ad truncos muscosos, 1,800 m. s. m.

Near *Polypodium nutans* Blume, with authentic specimens of which Dr. Christ has kindly compared it.

Polypodium yoderi Copeland.

Rhizomate filiforme, paleis brunneis lanceolato-ovatis sparsis vestito; stipite lignoso, ca. 2 cm. alto, pilis atro-rubris distantibus 2 mm. longis vestito vel deorsum glabrescentibus, rhizomate haud articulato; fronde 15–25 cm. alta, lanceolata, bipinnata; rhachi piloso; pinnis adscendentibus, 5 mm. latis, contiguis, rhachibus pinnarum alatis; pinnulis sterilibus angustissimis, deorsum vix 0.25 mm. latis, sursum paulo latioribus, plerumque pilos solitarios terminales ferentibus; fertilibus spatulatis; soro solitario, in parte superiore dilatata pinnulae.

PANAY, monte Madiaas, *A. E. Yoder*.

Very near the Bornean *P. taxodioides* Baker, but clearly characterized by the strongly spatulate fertile pinnules, bearing the sori above the middle. As is true of various epiphytic *Eupolypodia* of the montane mossy forests, there is no trace of an articulation of the stipe to the rhizome.

Polypodium tenuisectum Bl.

MINDANAO, Davao, Mount Apo, *Copeland* 1529. NEGROS, Canlaon Volcano, *Banks*.

Malaya.

Polypodium (Schellolepis) mengtseense Christ. (Tab. 21.)

LUZON, Benguet, Ambuklao, *Copeland* 1829. Ad terram, 750 m. s. m.; Adouay, 1,200 m. s. m., *Copeland* 1831; Twin Peaks, 800 m. s. m., *Copeland* 1806; *Elmer* 6406; Baguio, *Elmer* 6002.

China.

A small, glabrous, terrestrial species, well characterized by the narrow, sharply serrate pinnæ. The texture and the ampleness of the pinnæ vary considerably with the environment.

Polypodium (Schellolepis) pseudoconnatum Copeland n. sp.

Rhizomate ca. 5 mm. crasso, lignoso, cretaceo, paleis brunneis lanceolatis acuminatis 5 mm. longis deciduis vestito; stipite 20 cm. alto vel ultra, valido, glabrescente; fronde 50 cm. alta, 30–35 cm. lata, acuminata; rhachi sursum sordido-paleacea; pinnis articulatis, plerumque oppositis, sessilibus, cordatis, acuminatis, crasso-serratis, herbaceis, fere glabris, inferioribus maximis 20 cm. longis, 18 mm. latis; venulis in seriam unam areolarum majorum, interdum in alteram multo minorum anastomosantibus; soribus magnis, infra prominentibus. (Tab. 22.)

LUZON, Lepanto, Bagnen, *Copeland* 1904 a, 1917. Epiphyticum (an semper?) 1,900 m. s. m.

Typically different from *P. subauriculatum* Bl. in the quite opposite cordate

pinnæ; coarsely, in the lower part obtusely, serrate, and in the large, superficial sori—the last an evident adaptation to the climate of the mossy forest. My No. 1836, from Daklan, Benguet, differs from the type in having scattered pinnæ.

The following key includes the named species of *Schellolepis* at present known in the Philippines:

1. Pinnæ narrowed to the base.
    2. Sori very deeply immersed .... *P. verrucosum*
    2. Sori only moderately immersed .... *P. persicaefolium*
1. Pinnæ with broad base.
    2. Lamina hirsute .... *P. beddomei*
    2. Lamina not hirsute.
        3. Pinnæ narrowly triangular .... *P. argutum*
        3. Pinnæ not uniformly narrowed from base to apex.
            4. Sori superficial .... *P. pseudoconnatum*
            4. Sori more or less immersed.
                5. Epiphytic .... *P. subauriculatum*
                5. Terrestrial .... *P. mengtseense*

Polypodium persicaefolium Desv. is the plant of Mount Apo, mentioned in my Polypodiaceæ, p. 123, as *P. phlebodioides*.

Polypodium molliculum Copel., Perkins Fragmenta, p. 190, non Kunze in Linnaea **25**: 749, may be a depauperate form of *P. beddomei* Baker. I have now more typical material of this species from Lepanto, and a similar or identical plant from Mindanao. *Cuming* 203, determined by Mettenius (Polypodium, p. 81.) as *P. pallens* Bl., probably belongs here.

Polypodium argutum Wall., is common on Mount Data, Province of Lepanto, Luzon, *Copeland* 1892.

India.

Polypodium lineare Thunb.

Luzon, Province of Benguet, *Copeland* 1941.

Africa to Japan.

Polypodium (Phymatodes) luzonicum Copeland n. sp.

Rhizomate scandente, 2 mm. crasso, paleis atro-brunneis lanceolatis longo-acuminatis minute ciliatis vestito; stipitibus 1–5 cm. altis, stramineis, paleis brunneis deciduis vestitis; fronde lanceolata vel oblanceolata, 20–30 cm. alta, usque ad 4 cm. lata, integra, acuminata, deorsum sensim attenuata, glabra, papyraceo-coriacea; venis primariis conspicuis marginem fere attingentibus, venulis occultis; soris magnis, inter venas primarias in seriebus 2, praeterea plerumque in seriebus 1–3 rectis costae parallelibus instructis, superficialibus. (Table 23.)

Luzon, Lepanto, Bagnen, *Copeland* 1918. Epiphyticum, 1,900 m. s. m.

This fern belongs to the very natural group including *P. zippelii*, *P. heterocarpum*, and *P. ensatum;* it is readily recognizable by the regularity of arrangement and size of the sori.

Polypodium (Phymatodes) dolichopterum Copeland n. sp.

Rhizomate ad terram humidam repente, apice squamulis atris lanceolatis 2–3 mm. longis vestito; stipitibus seriatis, in ramos pedestales 1 mm. altos articulatis, 10–15 cm. altis, 1–1.5 mm. crassis, stramineis, glabris vel deorsum sparsissime paleaceis; fronde deltoidea, ad alas 2–5 mm. latas pinnitifida, ca. 3 cm. ad stipitem decurrente, glabra, membranacea; segmentis divaricatis, lanceolatis, infimis 10–12 cm. longis,

10–12 mm. latis, integris vel undulatis, acuminatis; sinubus quam basibus segmentorum latioribus; venulis in reticulam perlaxam anastomosantibus, venulis inclusis paucis; soris sparsis vel irregulare instructis, orbicularibus vel oblongis, superficialibus.

MINDANAO, Zamboanga, San Ramon, 800 m. s. m., *Copeland* 1717.

This fern suggests *P. insigne* Blume, and is more like the original than more recent descriptions of that species. It is well distinguished by its slenderness, segments connected by a wing instead of directly confluent, briefly decurrent base, and lax venation.

Polypodium (Phymatodes) rivulare Copeland n. sp.

Rhizomate repente, 1.5–2.5 mm. crasso, paleas sparsas lanceolatas acuminatas atras ferente, carnoso, sicco fragile, interdum viride; stipitibus 5–10 cm. altis, glabrescentibus, stramineis, supra anguste alata, pede exalato 1–5 cm. alto; fronde 10–16 cm. alta, late ovata, ad alam pinnis latetudine aequalem pinnatifida, glabra, membranacea; segmentis 1–4-jugatis, usque ad 7 cm. longis, 5–8 (maximis 14) mm. latis, acutis, integris vel undulatis, segmento terminale plerumque longiore; venis irregulariter confluentibus, omnibus (costis exceptis) inconspicuis; soris 1–1.5 mm. latis, irregulariter sparsis.

LUZON, Laguna, Los Baños, *Copeland* 2021. Ad saxa rivularia; Batangas, monte Malarayat, *Copeland* 1998.

The smallest and most delicate species of the natural group of *P. pteropus* Bl. and *P. insigne* Bl., remarkable because the midribs of the segments have no branches visible by reflected light. Judging by the description alone, *P. pentaphyllum* Baker is a decidedly larger and coarser fern, with shorter stipe; and its rhizome is said to be woody.

Polypodium (Phymatodes) phanerophlebium Copeland n. sp.

Rhizomate scandente, 15 mm. crasso, radices permultas emittente, squamis ovatis vel orbiculatis peltatis integris imbricatis persistentibus 5 mm. longis vestito; stipite glabro, 40–80 cm. alto, 7–10 mm. crasso, supra canaliculato; fronde ca. 1.5 m. alta, 60 cm. lata, glabra, herbacea vel subcoriacea, pinnatifida; segmentis majoribus 35 cm. longis, 45 mm. latis integris, acuminatis, ala 10–15 mm. lata connexis; venis praecipuis areolas primae ordinis includentibus perconspicuis, infra exstantibus, marginem non attingentibus; venatione ultima Polypodii affinis; soris magnis, 3–5 mm. latis, vix immersis, plerumque biseriatis, in areola grande quaque uno. (Tab. 24.)

MINDANAO, Davao, monte Apo, *Copeland* 1550. In arboribus epiphyticum, 1,200 m. s. m.

Near *P. affine* Blume, but larger and stouter, with conspicuous venation, most distinct in the clothing of the rhizome.

The real nature of Blume's *Polypodium affine* is not absolutely clear. The original description, in *Flora Javae*, **2**: 160, is: "*Filix mirifica, saepe orgyalis et altior.*" * * * 'Caudex as thick as the little finger, * * * dull green, entirely naked or with scattered solitary peltate dark-brown resinous-shining remnants of scales. * * * Fronds 1½ to nearly 3 feet high, 10 to 15 inches broad, oblong, acuminate, decurrent, membranaceous, glabrous, black-punctate

above. * * * Segments 10 to 18 on each side, erecto-patent, * * * lanceolate, acuminate, entire, '*unicostatae et pulcherrime reticulatae,*' the lower gradually smaller. Stipe 2 to 3 feet high, straight, as thick as the quill of a goose or of a swan, * * * greenish. Sori * * * scattered or subseriate in a sort of double row on each side of the midvein * * *. Easily distinguished from *P. phymatodes* L. by the membranous texture and the entirely superficial sori.' The accompanying Plate 69 shows the lower pinnæ the size of the succeeding, the rhizome bearing many acute scales, and the sori 1½ to 2 mm. in diameter.

Raciborski, in *Pteridophyten der Flora von Buitenzorg,* p. 113, describes it as having "Rhizome * * * black, 5 mm. or less thick, clothed with round entire appressed scales 1 to 1½ mm. in diameter. Stipe 5 to 40 cm. high, 4 mm. or less thick, smooth. Lamina thin, pellucid, naked, 20 to 30 cm. broad, 30 to 80 cm. long, deeply pinnatifid. * * * Segments linear, * * * 1.5 to 2 cm. broad, up to 15 cm. long. * * * In each areola, one round sorus, 1.5 to 2 mm. broad, superficial or sunken."

If the statements of Blume and Raciborski, where they conflict, be construed as both being correct, and covering the plant's range of variation, they still include only plants much less stout in many respects than that from Mount Apo. The size of the paleæ and of the sori and the firm texture are most conspicuous characteristics of the latter.

Mettenius, Polypodium No. 221, redescribed *P. affine,* with Cuming's No. 97, from Luzon, as his material. This is identical with my No. 1582, from San Ramon. Its venation is comparatively obscure, but in pattern the same as that described by the Javan writers. It can be included in all respects by a combination of the descriptions by Blume and Raciborski, having a green, naked rhizome, stipe usually less than 1 foot high, and sori about 2 mm. in diameter, sometimes somewhat immersed. I can not distinguish it in any way from *P. commutatum,* which is probably a synonym.

Polypodium (Phymatodes) proteus Copeland n. sp.

Rhizomate ad terram repente, paleis 3 mm. longis ferrugineis subulatis brevissime ciliatis basibus peltatis ovatis vel interdum hastatis vestito; stipitibus 6–170 mm. altis, glaberrimis; frondibus polymorphis, glabris, coriaceis, marginibus angustis cartilagineis; nunc simplicibus, integris, 5–50 mm. altis, oblongis vel lanceolatis, utrinque obtusis, soris inter venas primarias solitariis; rarius trifidis; saepius pinnatis, usque ad 20 cm. altis, fere eadem latitudine; pinnis 1–4 jugatis, lanceolatis, acutis vel acuminatis nec usquam caudatis, integris vel undulatis, sessilibus, interdum adnatis vel infimis brevi-stipitatis, ad rhachin articulatis; venis primariis conspicuis, marginem vix attingentibus, venulis immersis; soris aut inter venas primarias solitariis costae proximis, aut 2–3-seriatis interdum confluentibus, leviter immersis. (Tab. 25.)

LUZON, Benguet, inter Suyoc et Pauai, 1,800 m. s. m., *Copeland* 1941 bis.

In spite of its extreme variability and local abundance, I can identify this plant with no known *Phymatodes* or *Selliguea;* nor has it appeared hitherto in our rich collection of Benguet ferns. It grows on dry, rocky ground, the exposed plants being small and frequently simple, those sheltered by crevices larger, and finally pinnate. The articulation of the pinnæ is an interesting adaptation to the arid habitat.

Polypodium flexilobum Christ in Acad. Mans. Geog. Bot. 1894, p. 107.

LUZON, Province of Bataan, Lamao, *Copeland* 220, det. by Christ. MINDANAO, Davao, Todaya, *Copeland*. Not very distinct from *P. ellipticum* Thunb.

DRYOSTACHYUM J. Sm.

Dryostachyum splendens J. Sm., Hooker's Journ. Bot. **3**: 339; **4**: 62; Copeland, Polypod. Phil. Ids., 134.

Fronde deorsum in alam scariosam humiferam latam fere ad rhizomatem protracta. (Tab. 26, 27.)

LUZON, *Cuming* 87. MINDANAO, *Copeland* 1285.

Dryostachyum pilosum J. Sm., Schkuhr. (*D. splendens* Diels in Nat. Pflnfam. I, **4**: 327, *Fig. 170.*)

Fronde deorsum in stipitem brevem attenuata, nec enim scariosa; rhizomate ca. 5 mm. crasso.

LUZON, *Cuming* 90; MINDANAO, San Ramon, 200 m. s. m., *Copeland* 1666.

This has generally been regarded as not distinct from *D. splendens* J. Sm., and if Hooker[2] had been correct in assuming that they differed only in pubescence, he would have been well justified in combining them. But the base of the frond is entirely different. *D. splendens* is a much larger and stouter fern, forming "nests," the basal part of the frond being a hard, brown humus receptacle. Cuming's specimens in the herbarium of the Bureau of Science, Manila, do not show quite the whole frond of either species; but they are sufficient for the positive identification of my Mindanao plants of both.

Both species have apparent articulations just above the attachment to the rhizome; but I strongly suspect, especially in the case of *D. splendens*, that this articulation is merely a vestigial structure, and that *D. drynarioides* (Hooker) Kuhn is therefore not distinct in this respect.

A satisfactory disposition of all these plants would be to include them with *Aglaomorpha*, separating the latter from *Polypodium*.

THAYERIA Copeland, genus novum.

Polypodiacea epiphytica Drynariae affinis. Rhizomate crasso; fronde solitaria in ramo laterale rhizomatis endogena, cornucopiaeforme; ramo in fundo cornucopiae in radiculas multas dissipato; textura frondis, venisque Drynariae. Soris verisimiliter ad partem contractam apicalem frondis diversae restrictis. Genus viro doctissimo Alfredo Thayer, professori universitatis texanae dedicatum.

Thayeria cornucopia Copeland.

Rhizomate late scandente vel saepius descendente, 2–3 cm. crasso, squamulis lanceolatis subpeltatis acuminatis 1–1.5 mm. longis appressis vestito; ramo frondiferente 2–6 cm. longo, ca. 1 cm. crasso, horizontale, frondem e latere fisso emittente; fronde deorsum scariosa, fusca, lobis basalibus grandibus invicem involventibus, sursum viride, fere plana, glabra, profunde pinnatifida, segmentis deciduis. (Tab. 28.)

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[2] *Syn. Fil.* **5**: **96**.

MINDANAO, Zamboanga, monte Balabac, 1,200 m. s. m., *Copeland* 1770.

The close affinity of this remarkable fern to *Drynaria* is shown by the very characteristic texture—dry, with thin lamina stiffened by the strongly reinforced veinlets—the venation—a fine, regular net with free included veinlets—the dehiscence, from the costa, of the segments of the deeply pinnatifid frond, the fleshy, minutely scaly rhizome, and the humus-collecting habit. The most of these features it shares also with *Dryostachyum*, and with two so-called *Polypodia* of this region—*P. heracleum* and *P. meyenianum*. They show a near relationship, but do not make us regard plants as congeneric. In its humus-collecting structures *Thayeria* is wholly unlike any other known plant, the specialization having gone beyond the frond to the rhizome. Each leaf is a unit, a complete receptacle, wholly out of contact with the main rhizome. It is the most perfect of the humus-collecting organs developed in its group, the material collected being inclosed on all sides and protected against desiccation with a thoroughness not attained even by *Asplenium nidus*. The specialization of the branch end as a root bearer in the bottom of the cornucopia is a very novel feature.

After I first found this plant, my appreciation of its novelty grew, and I made a second trip—a nearly two days' journey into trailless mountains—in a vain attempt to secure fruiting specimens. It is common the length of one high ridge; but, so far as I could discover, is entirely sterile.

The New Guinea fern described as *Polypodium nectariferum* Baker in Beccari's Malesia, **2**: 247, *Plate 69*, is surely a *Thayeria*, the identification being insured by the sterile frond and the tortuous, stout rhizome, both very characteristic. I have sterile specimens from Lepanto-Bontoc in northern Luzon, *Copeland* 1927, agreeing with Beccari's figure even to the auriculate base. They have elongate, rather amorphous paleæ 7 mm. long, but these are deciduous except for a ragged, peltate base. It is also nectariferous. I call it **Thayeria nectarifera** (Baker).

ELAPHOGLOSSUM Schott.

Elaphoglossum callaefolium (Bl.) Moore.

MINDANAO, Mount Apo, *Copeland.*

Java.

LOMAGRAMMA J. Sm.

Lomagramma pteroides J. Sm.. Hooker's Journ. Bot. **4**: 152.

Luzon, *Cuming;* Mindoro, *McGregor* 235. McGregor's plant has membranous, green pinnæ, with evident, but not raised, venation. My Mindanao plants, No. 1736, distributed as *L. pteroides*, are distinct, and I have sterile specimens of still another species from Luzon. The genus appears to me to have constant and valid characters.

GLEICHENIA Sm.

Gleichenia laevissima Christ, Bull. Acad. Mans. 1902, p. 268.

LUZON, Benguet, Pauai, 1,900 m. s. m., *Copeland* 1954.

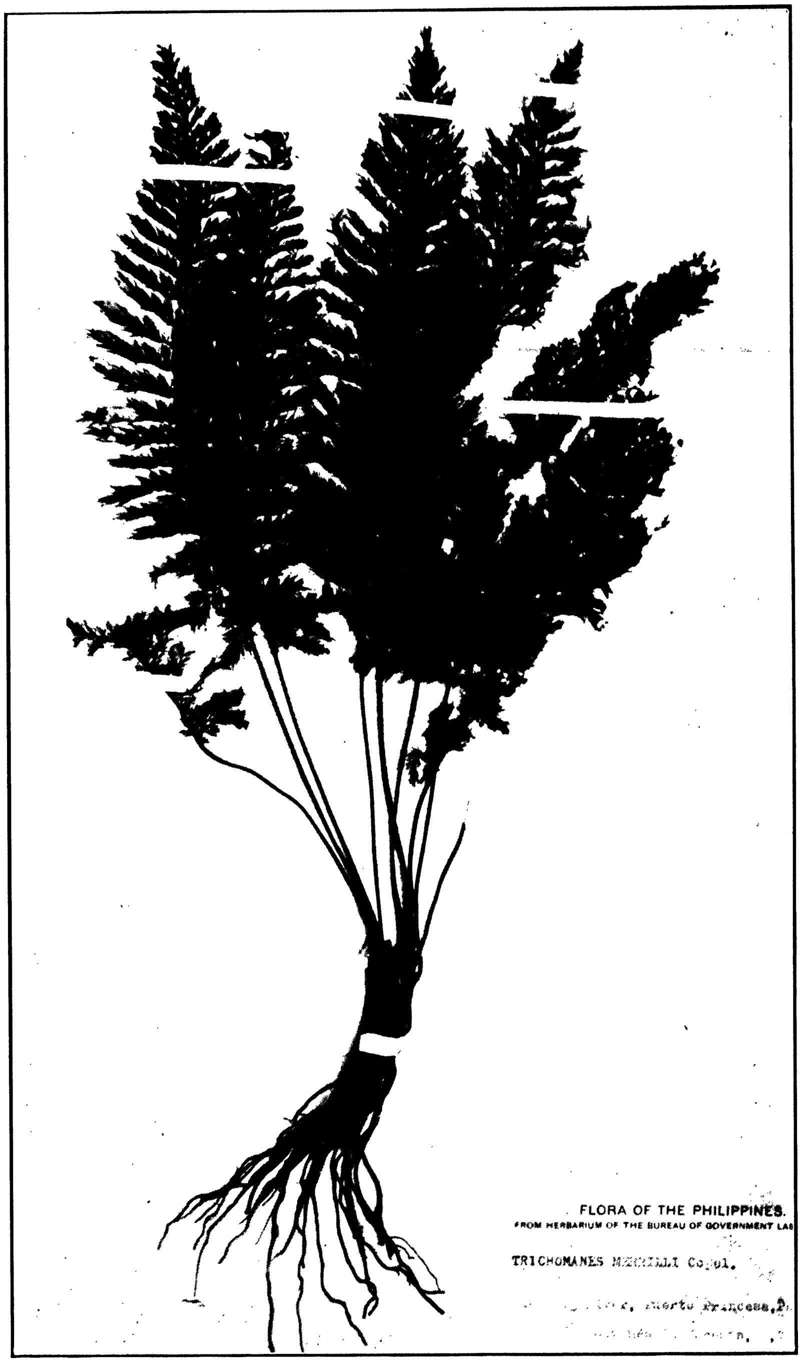
China.

Harder in leaf texture than its local relatives, and conspicuously different in the far from horizontal pinnules.

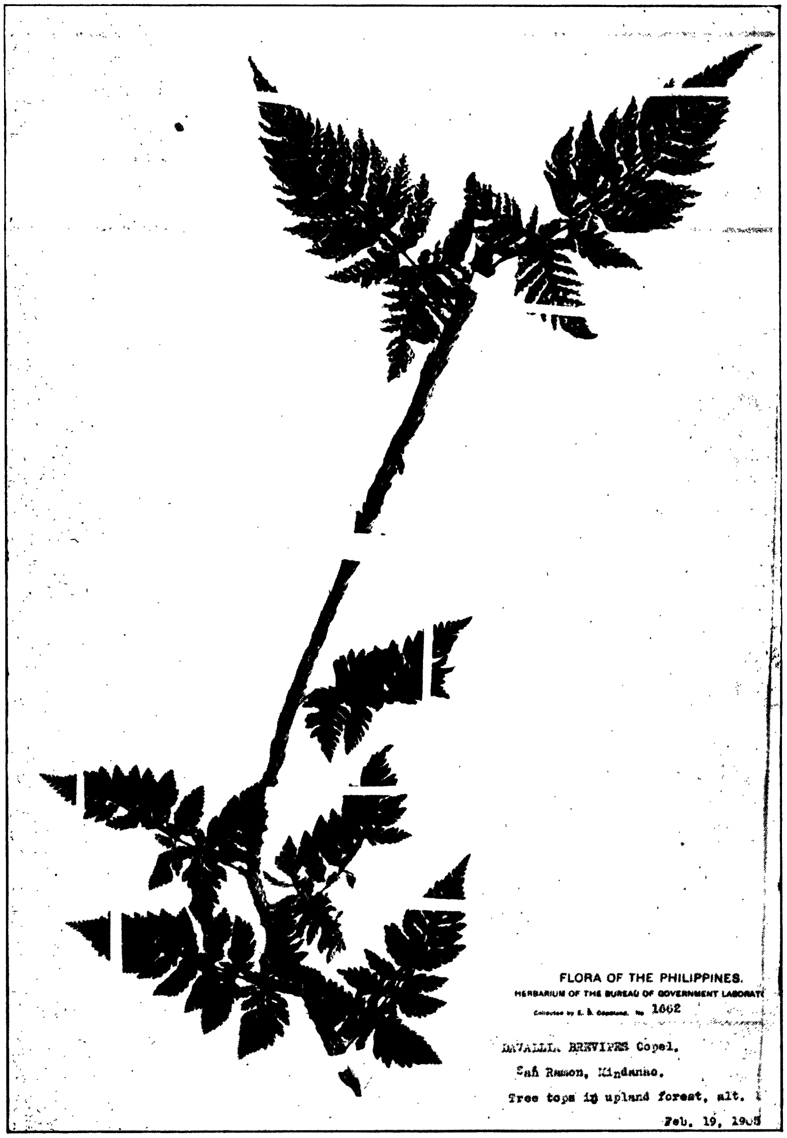
LIST OF PLATES.

[All photographs are by Martin. Except as otherwise noted, all figures are X ⅓ to ⅖.]

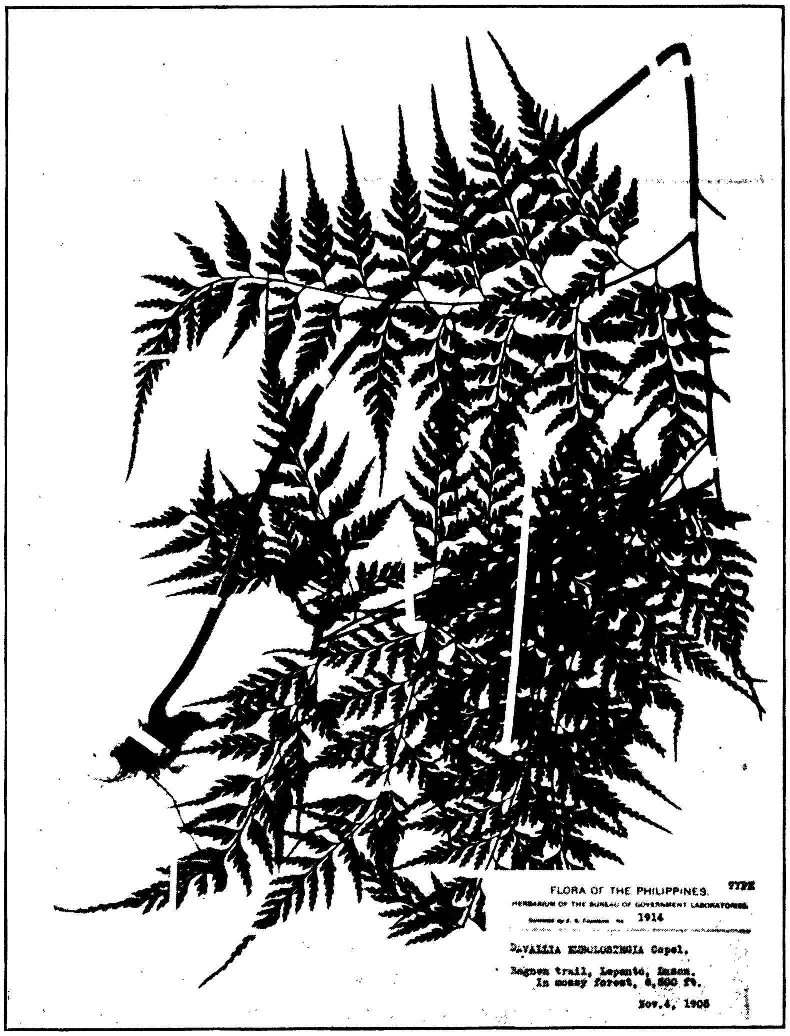
PLATE 1. *Trichomanes merrilli* Copel.
2. *Davallia brevipes* Copel.
3. *D. embolostegia* Copel.
4. *Microlepia dennstaedtioides* Copel.; (*a*) pinnule, X 1.7.
5. *Lindsaya cyathicola* Copel.
6. *Diplazium tabacinum* Copel.
7. *D. williamsi* Copel.
8. *D. fructuosum* Copel.
9. *Scolopendrium schizocarpum* Copel.
10. *Adiantum mindanaoense* Copel.
11. *A. spencerianum* Copel.
12. *Schizostege calocarpa* Copel.
13. *Christiopteris sagitta* (Christ) Copel.
14. (*a*) *Prosaptia cryptocarpa* Copel. X 0.48.
  (*b*) *P. alata* (Bl.) X 0.48 drawn from a specimen lent by the Buitenzorg institute.
  (*c*) *P. toppingii* Copel. X 0.48.
  (*d*) *P. cryptocarpa;* upper end of palea, X 24.
15. *Acrosorus exaltatus* Copel.
16. *Polypodium dolichosorum* Copel.
17. *P. decrescens* Christ.
18. *P. pseudoarticulatum* Copel.
19. *P. multicaudatum* Copel.
20. *P. erythrotrichum* Copel.
21. *P.* (*Schellolepis*) *mengtseense* Christ.
22. *P.* (*Schellolepis*) *pseudoconnatum* Copel.
23. *P.* (*Phymatodes*) *luzonicum* Copel.
24. *P.* (*Phymatodes*) *phanerophlebium* Copel.
25. *P.* (*Phymatodes*) *proteus* Copel.
26, 27. *Dryostachyum splendens* J. Sm.
28. *Thayeria cornucopia* Copel.; small frond X 1/6; detail of base X 1.


FLORA OF THE PHILIPPINES.
FROM HERBARIUM OF THE BUREAU OF GOVERNMENT LA
TRICHOMANES MERRILLI Copel.
Puerto Princesa,

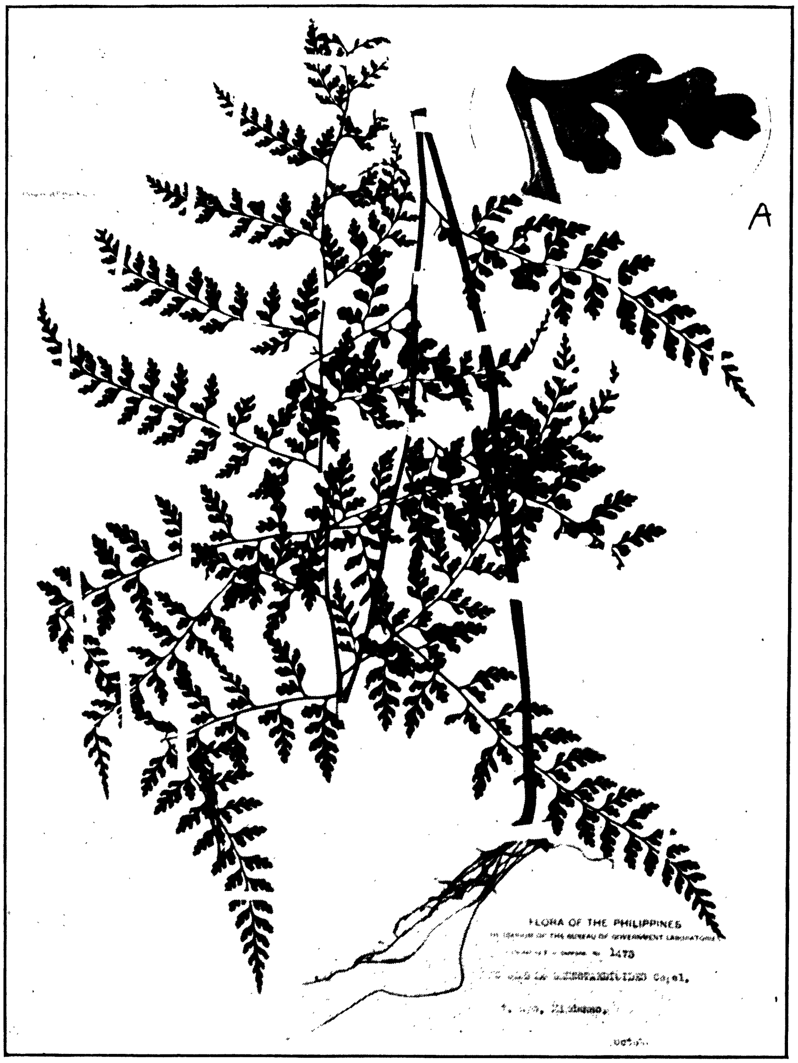
TAB. 1. TRICHOMANES MERRILLI COPEL.


FLORA OF THE PHILIPPINES.
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORAT
Collected by E. B. Copeland. No. 1662
DAVALLIA BREVIPES Copel.
San Ramon, Mindanao.
Tree tops in upland forest, alt.
Feb. 19, 1905

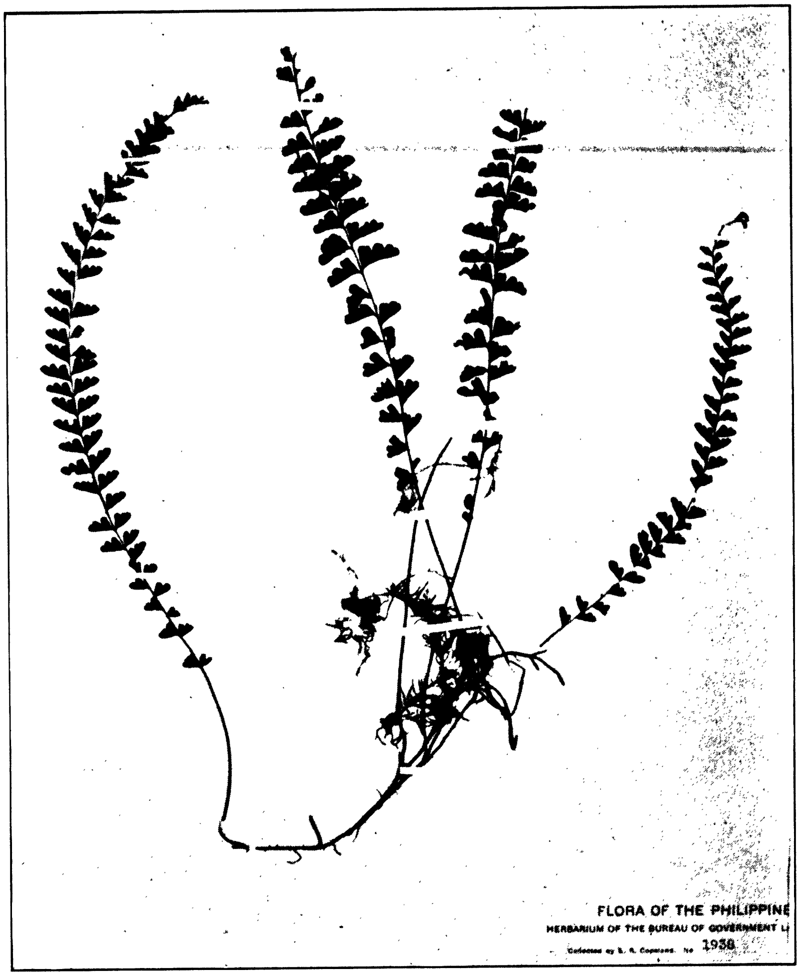
TAB. 2. DAVALLIA BREVIPES COPEL.


FLORA OF THE PHILIPPINES.
TYPE
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORATORIES.
1914
DAVALLIA EMBOLOSTEGIA Copel,
Bagnen trail, Lepanto, Luzon.
In mossy forest, 6,500 ft.
Nov.4, 1905

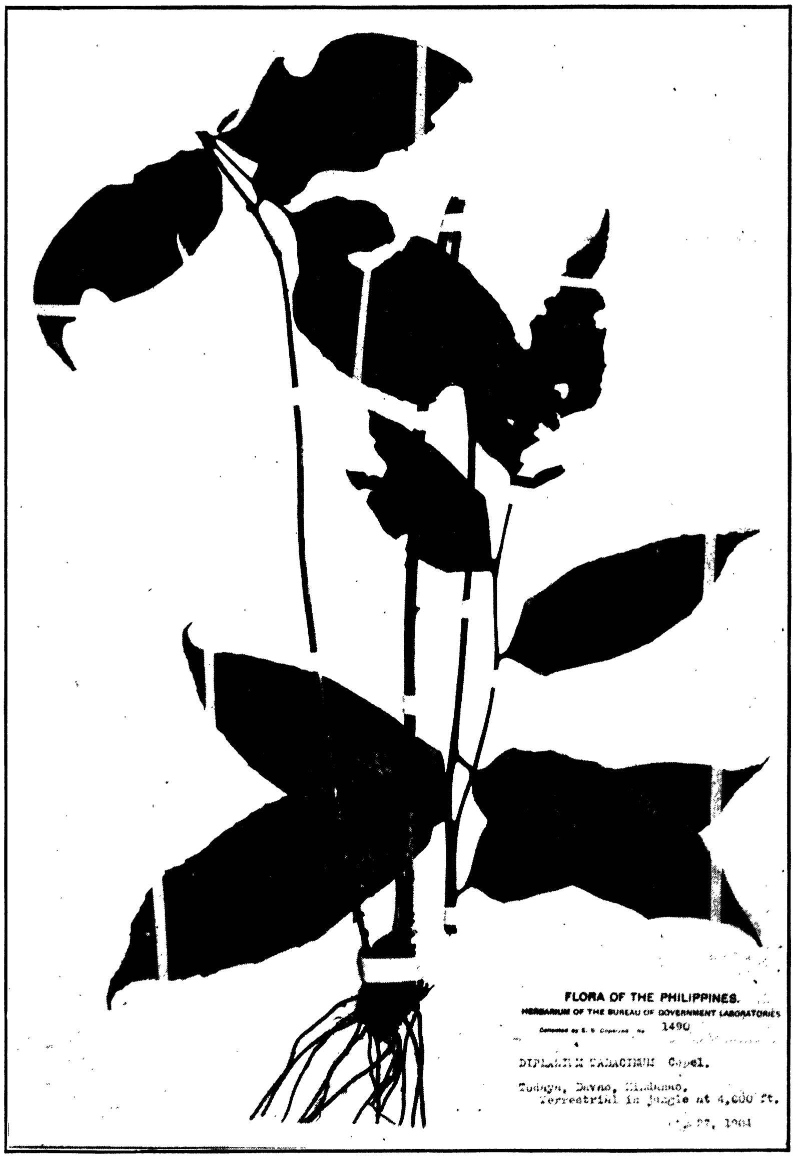
TAB. 3. DAVALLIA EMBOLOSTEGIA COPEL.



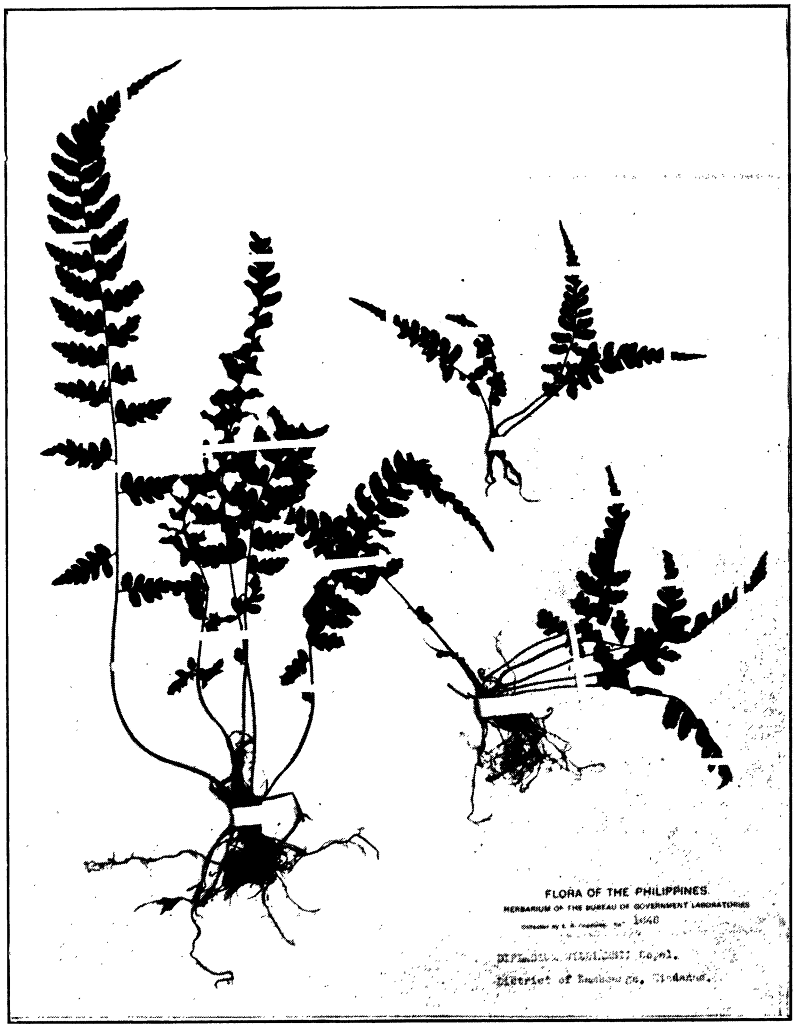
TAB. 4. MICROLEPIA DENNSTAEDTIOIDES COPEL.


FLORA OF THE PHILIPPINE
HERBARIUM OF THE BUREAU OF GOVERNMENT L
Collected by E. B. Copeland. No 1938

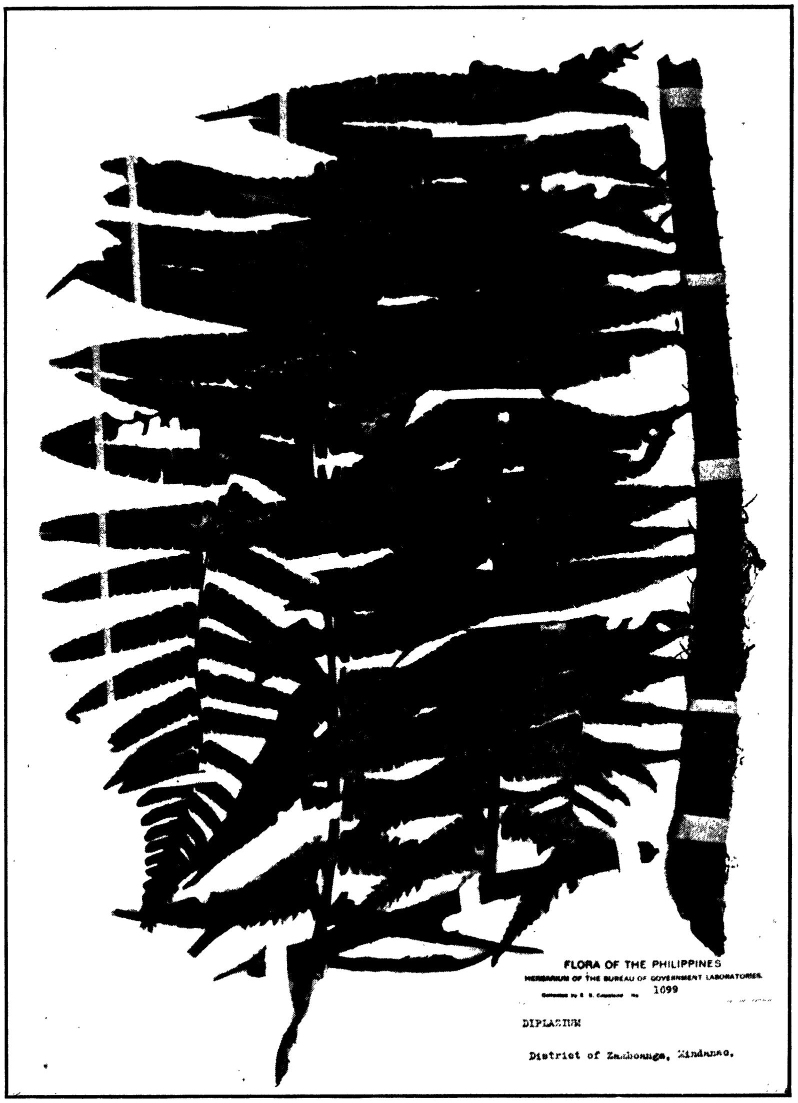
TAB. 5. LINDSAYA CYATHICOLA COPEL.


FLORA OF THE PHILIPPINES.
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORATORIES
Collected by E. B. Copeland No. 1490
DIPLAZIUM TABACINUM Copel.
Todaya, Davao, Mindanao,
Terrestrial in jungle at 4,000 ft.
27, 1904

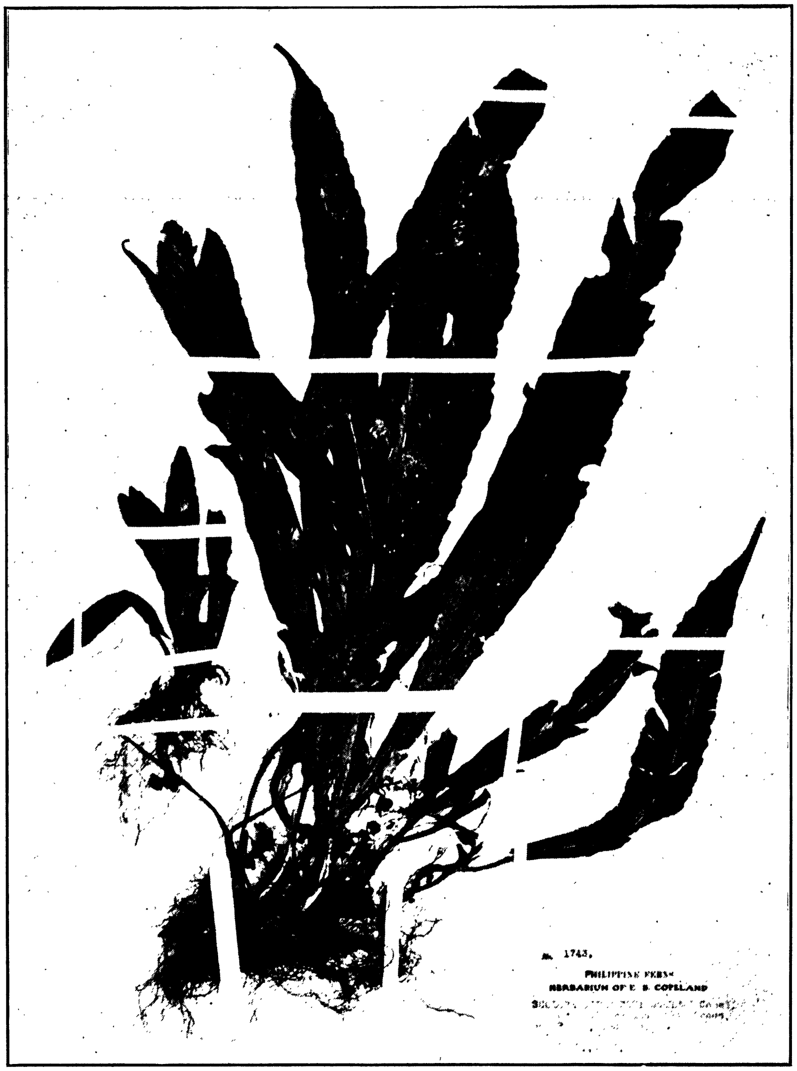
TAB. 6. DIPLAZIUM TABACINUM COPEL.



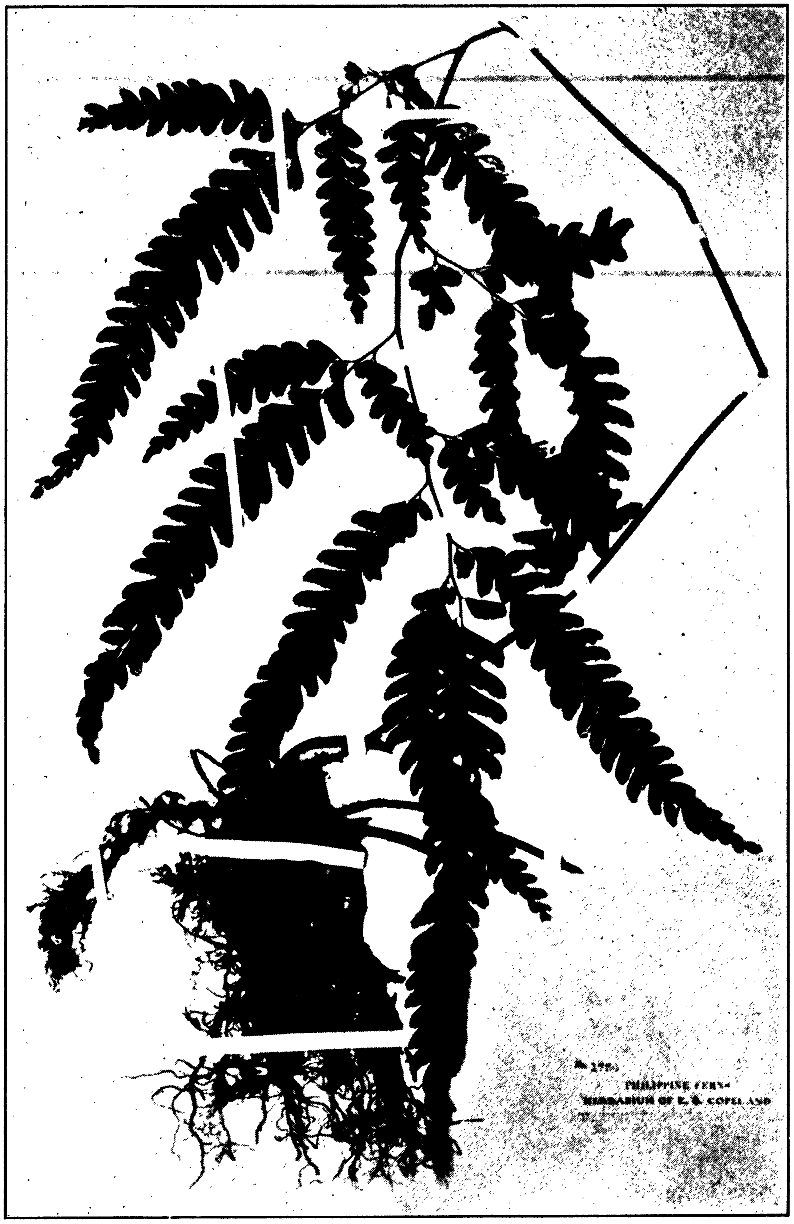
TAB. 7. DIPLAZIUM WILLIAMSI COPEL.


FLORA OF THE PHILIPPINES
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORATORIES
Collected by E. B. Copeland No. 1099
DIPLAZIUM
District of Zamboanga, Mindanao.

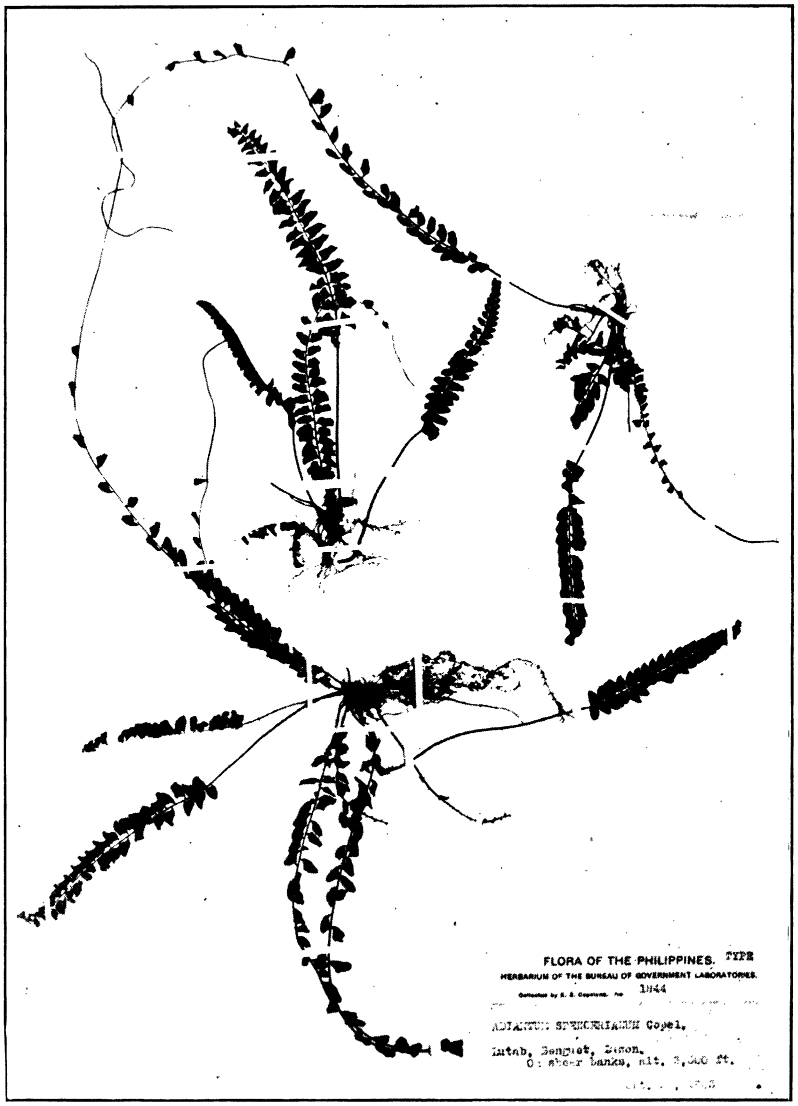
Tab. 8. DIPLAZIUM FRUCTUOSUM COPEL.



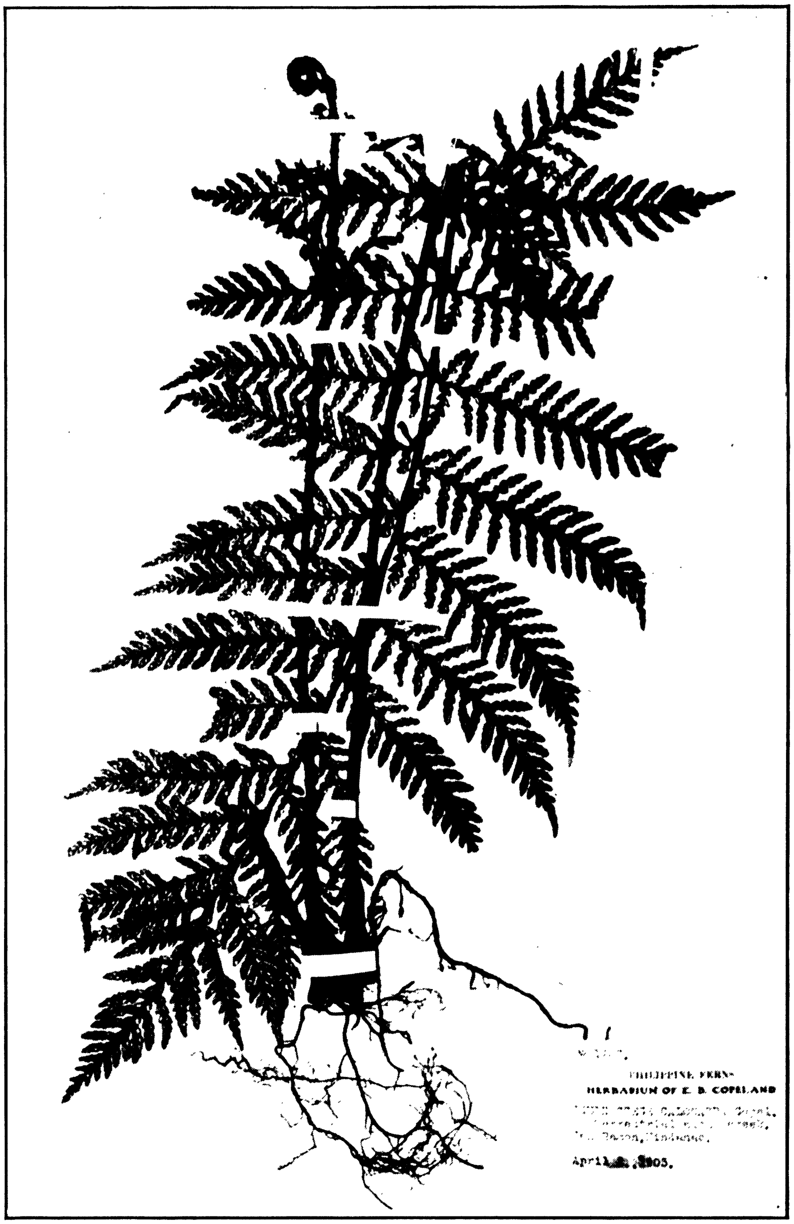
TAB. 9. SCOLOPENDRIUM SCHIZOCARPUM COPEL.



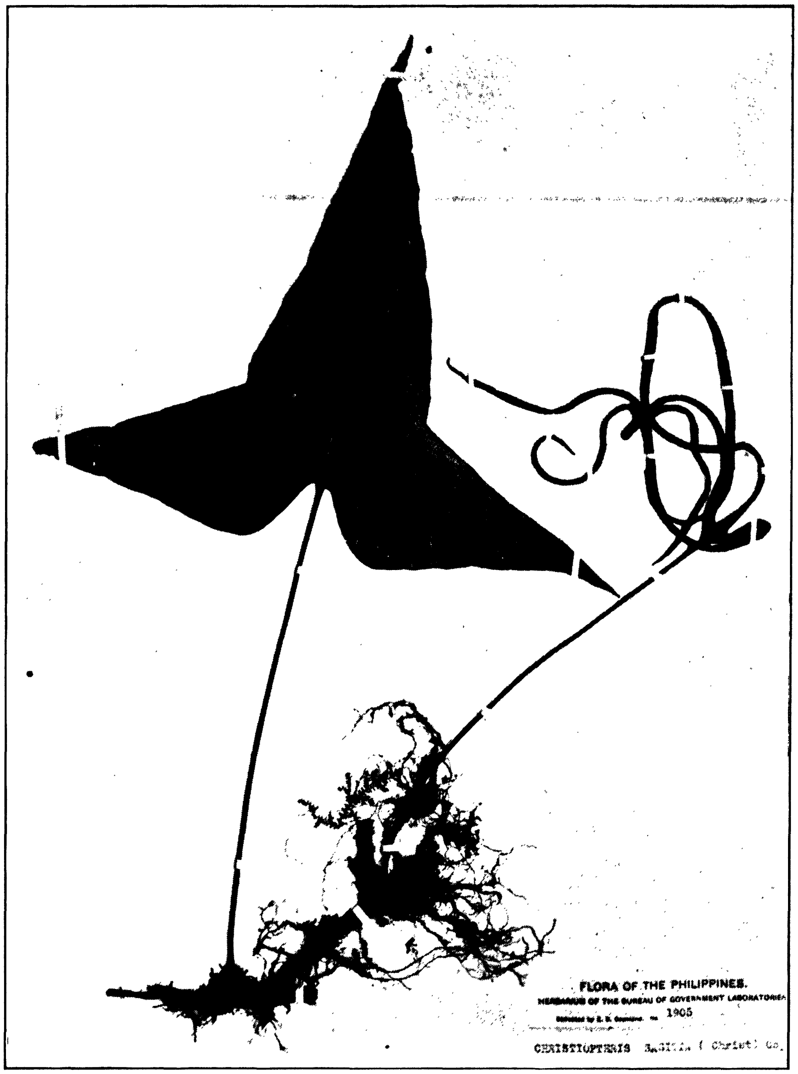
TAB. 10. ADIANTUM MINDANAOENSE COPEL.


FLORA OF THE PHILIPPINES. TYPE
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORATORIES.
Collected by E. B. Copeland. No 1844
ADIANTUM SPENCERIANUM Copel.
Lutab, Benguet, Luzon.
On sheer banks, alt. [illegible] ft.

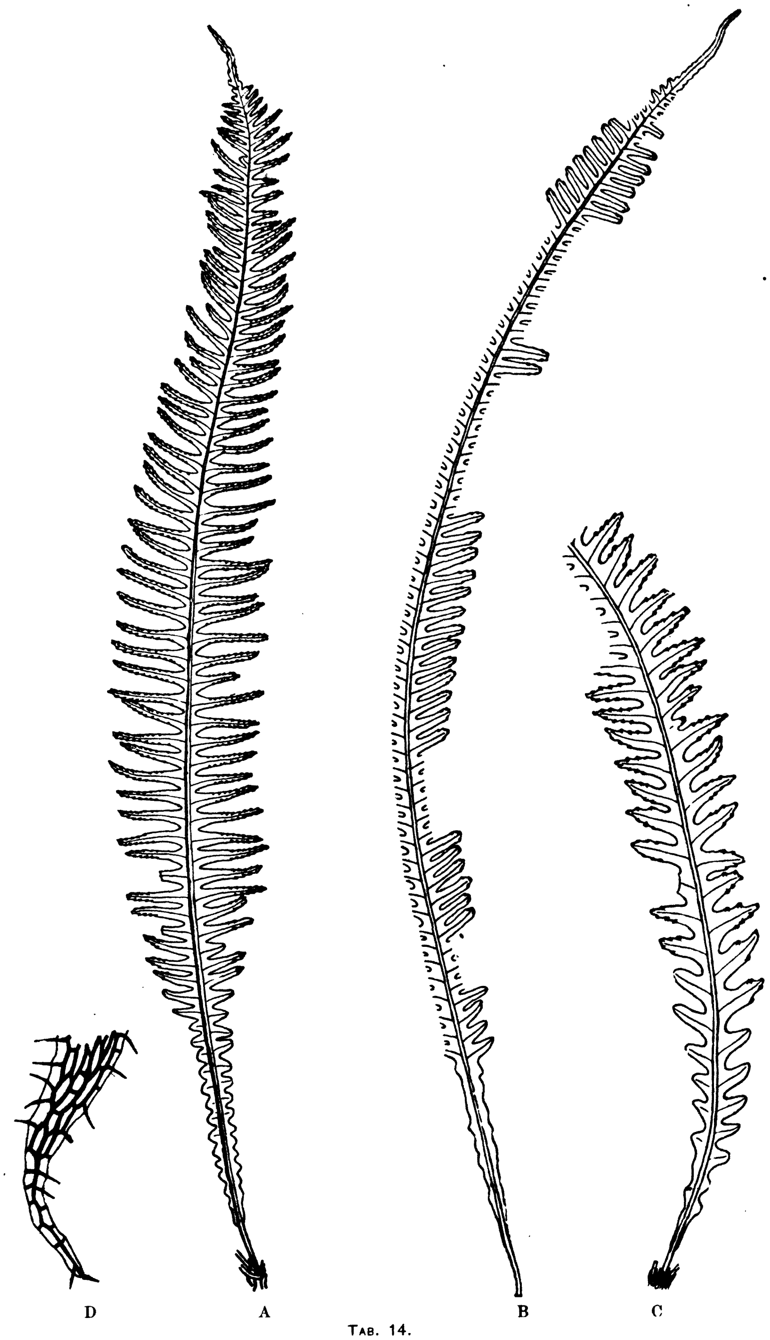
TAB. 11. ADIANTUM SPENCERIANUM COPEL.



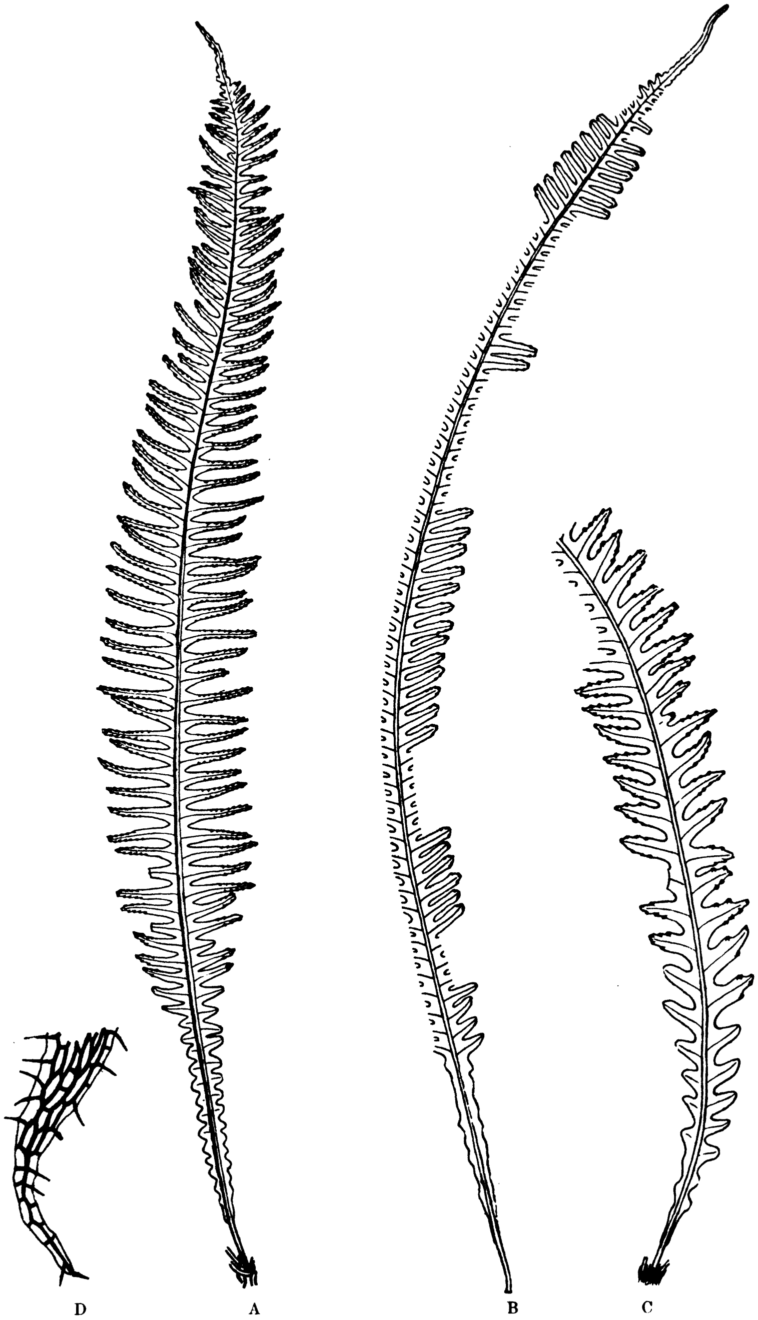
TAB. 12. SCHIZOSTEGE CALOCARPA COPEL


FLORA OF THE PHILIPPINES.
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORATORIES
1905
CHRISTIOPTERIS SAGITTA (Christ) Co.

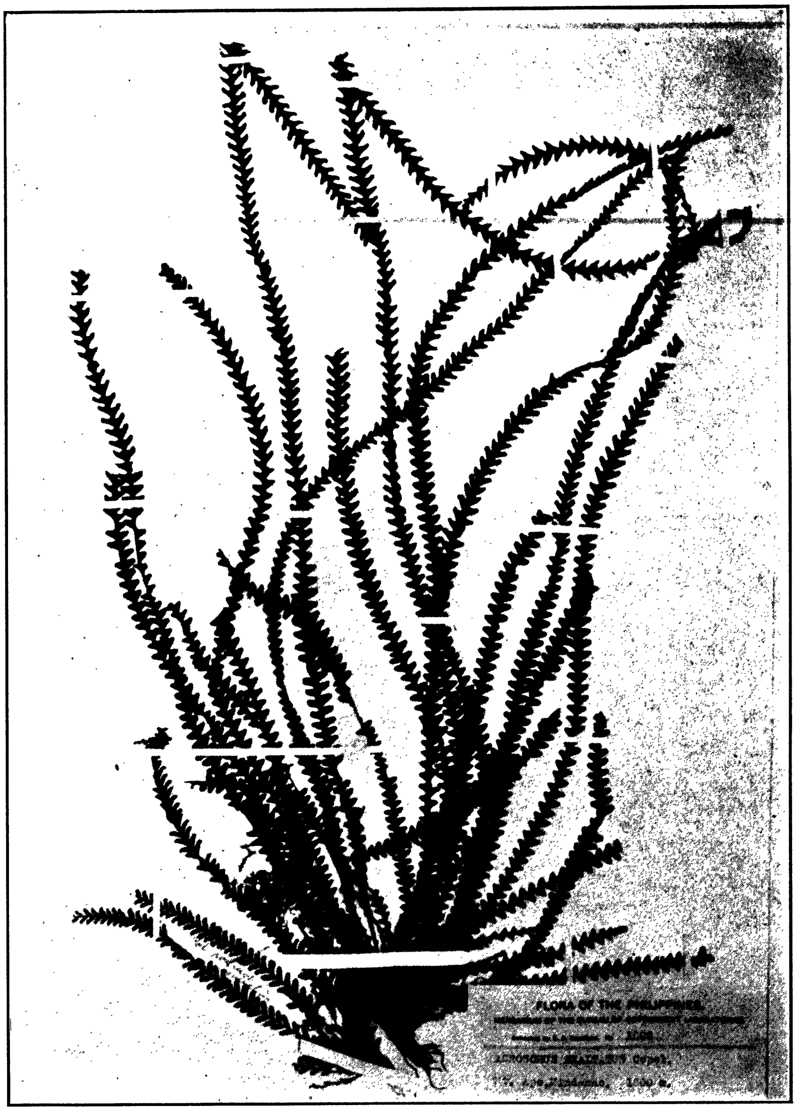
TAB. 13. CHRISTIOPTERIS SAGITTA (CHRIST) COPEL.



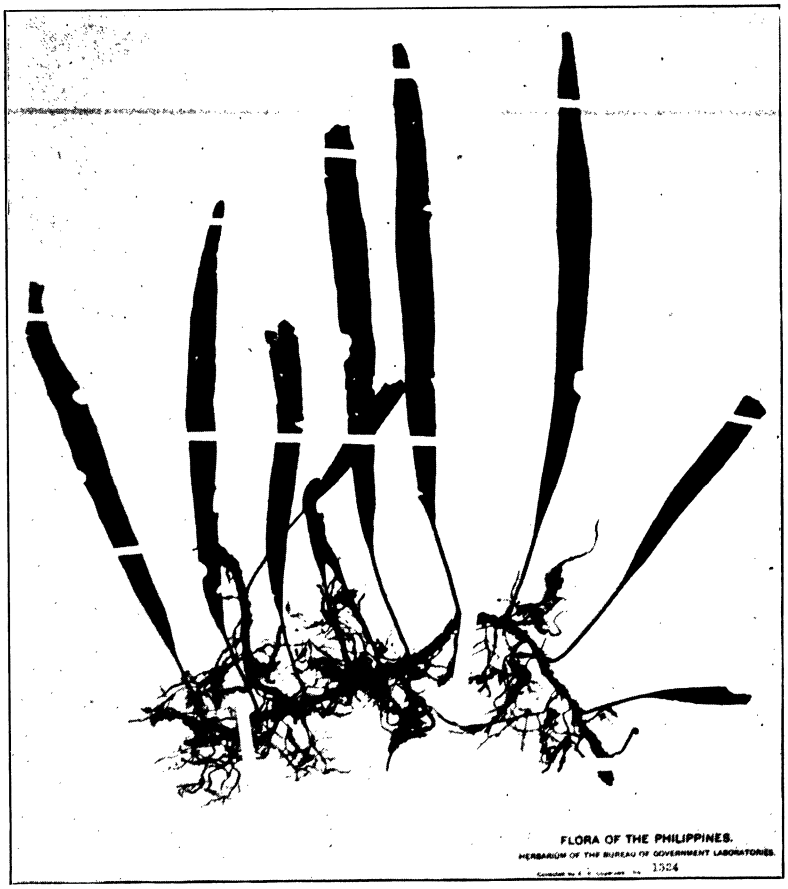
TAB. 14.



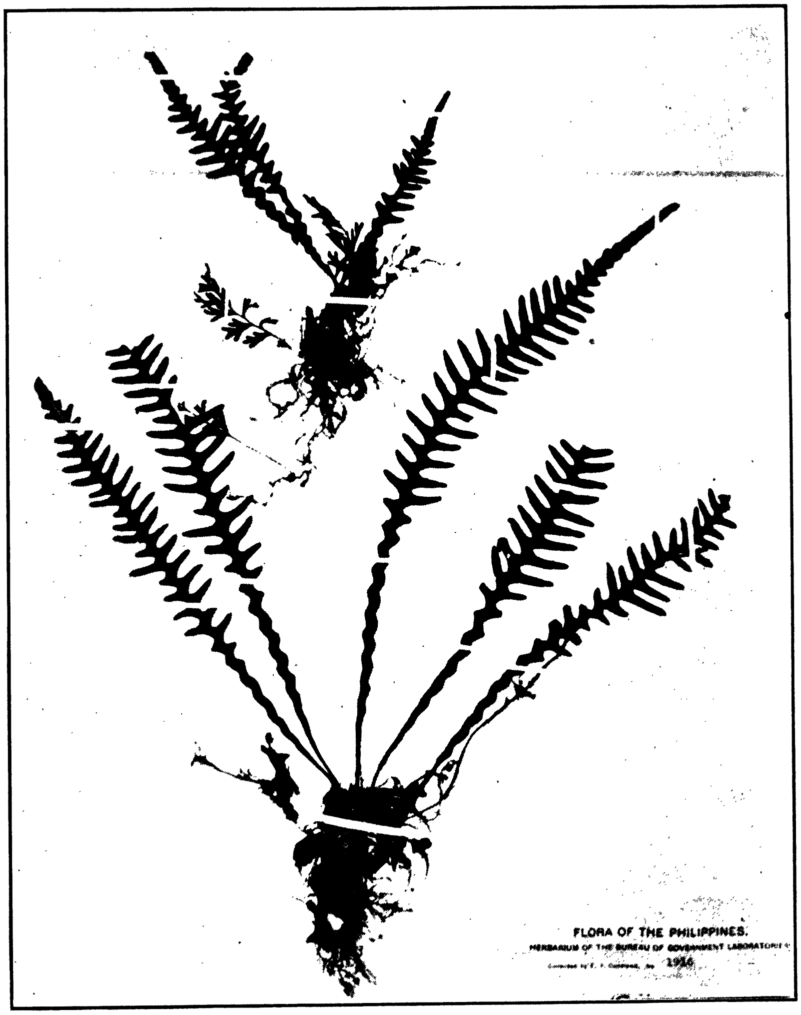
TAB. 14.



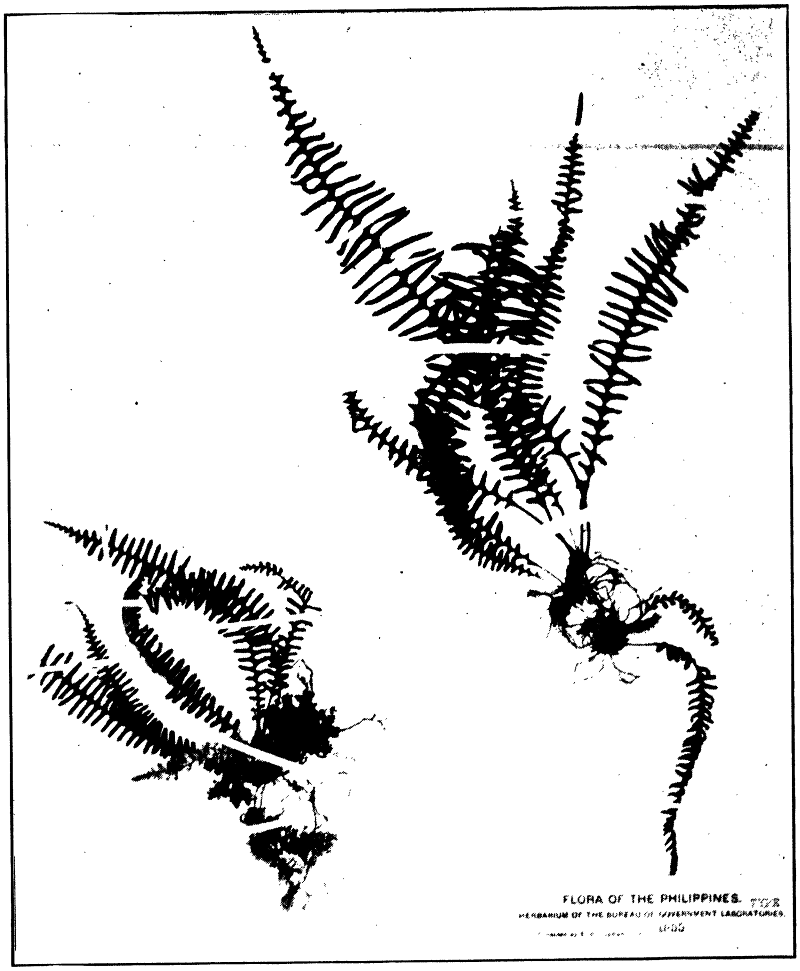
TAB. 15. ACROSORUS EXALTATUS COPEL.


FLORA OF THE PHILIPPINES.
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORATORIES.
1324

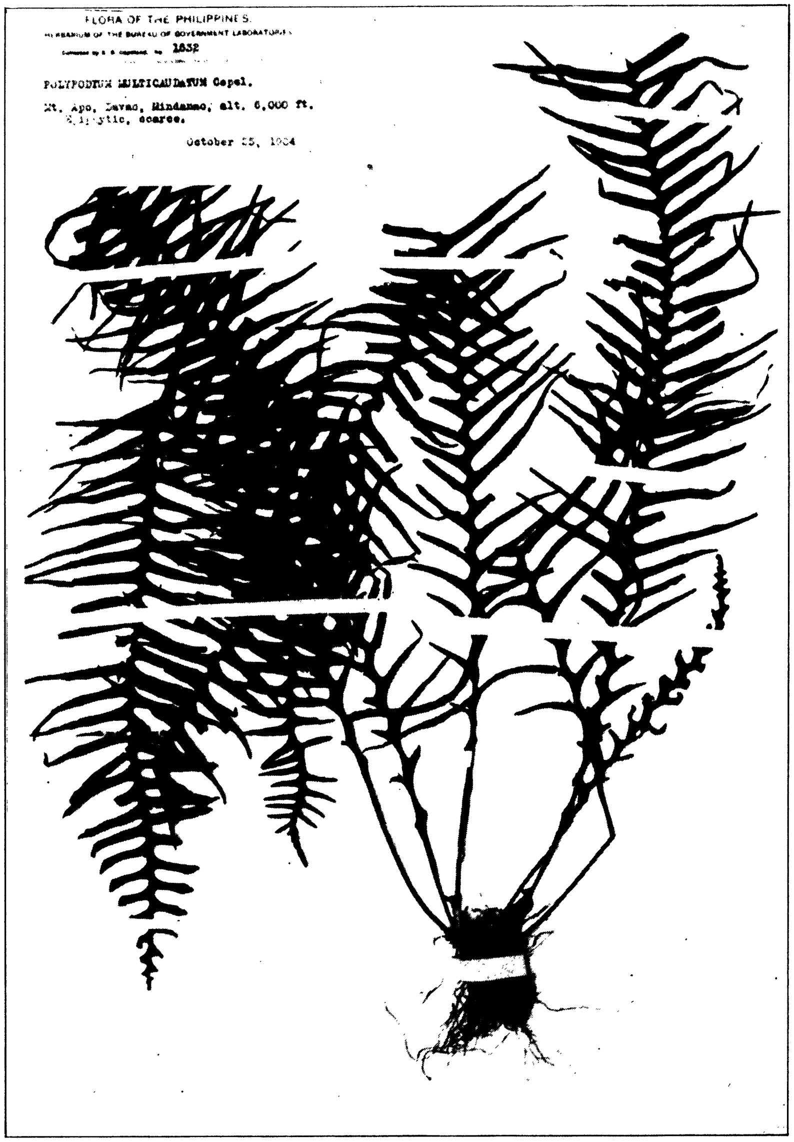
TAB. 16. POLYPODIUM DOLICHOSORUM COPEL.


FLORA OF THE PHILIPPINES.
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORATORIES
1916

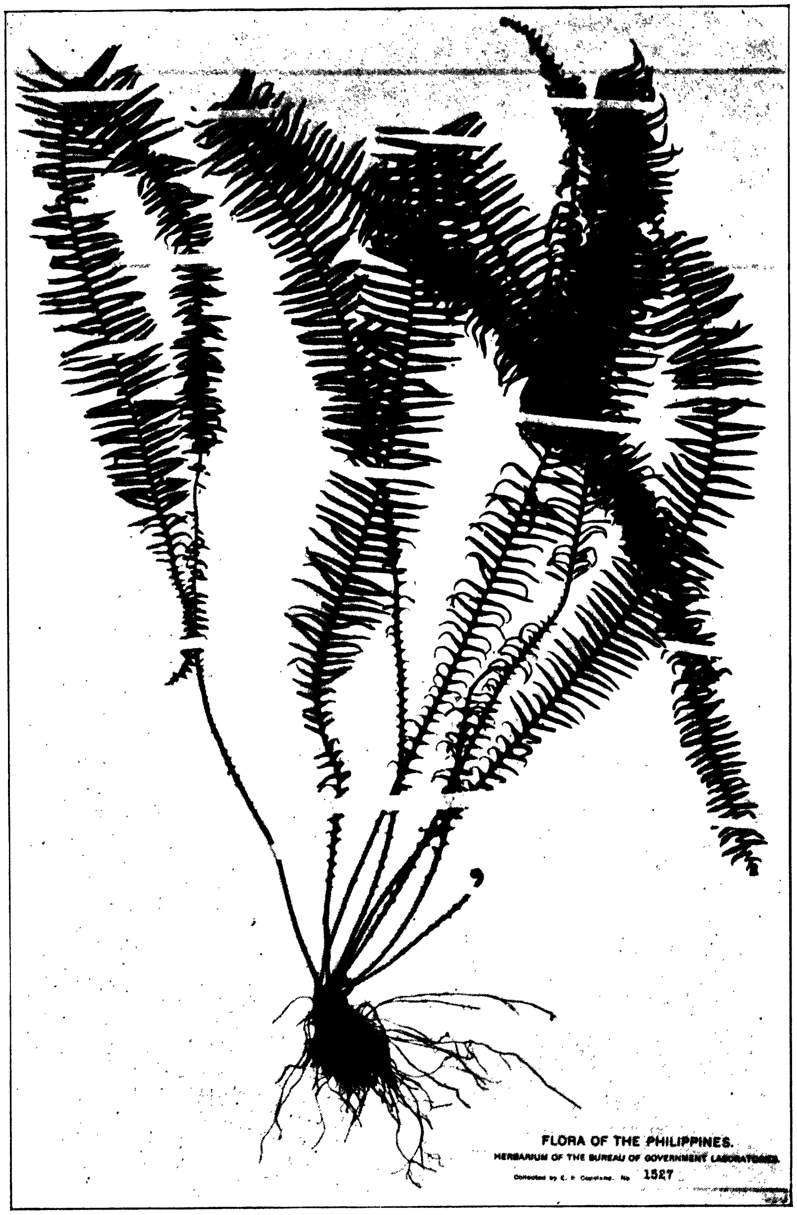
TAB. 17. POLYPODIUM DECRESCENS CHRIST.


FLORA OF THE PHILIPPINES.
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORATORIES.

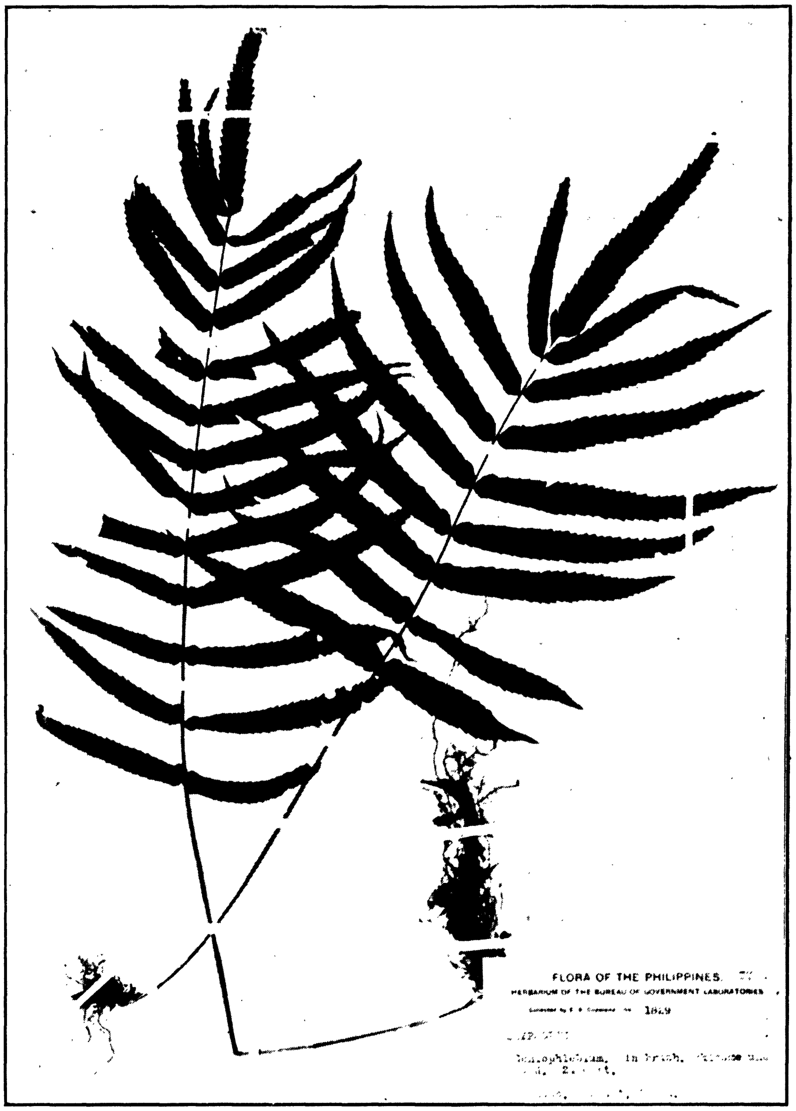
TAB. 18. POLYPODIUM PSEUDOARTICULATUM COPEL.


FLORA OF THE PHILIPPINES.
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORATORIES
1832
POLYPODIUM MULTICAUDATUM Copel.
Mt. Apo, Davao, Mindanao, alt. 6,000 ft.
Epiphytic, scarce.
October 25, 1904

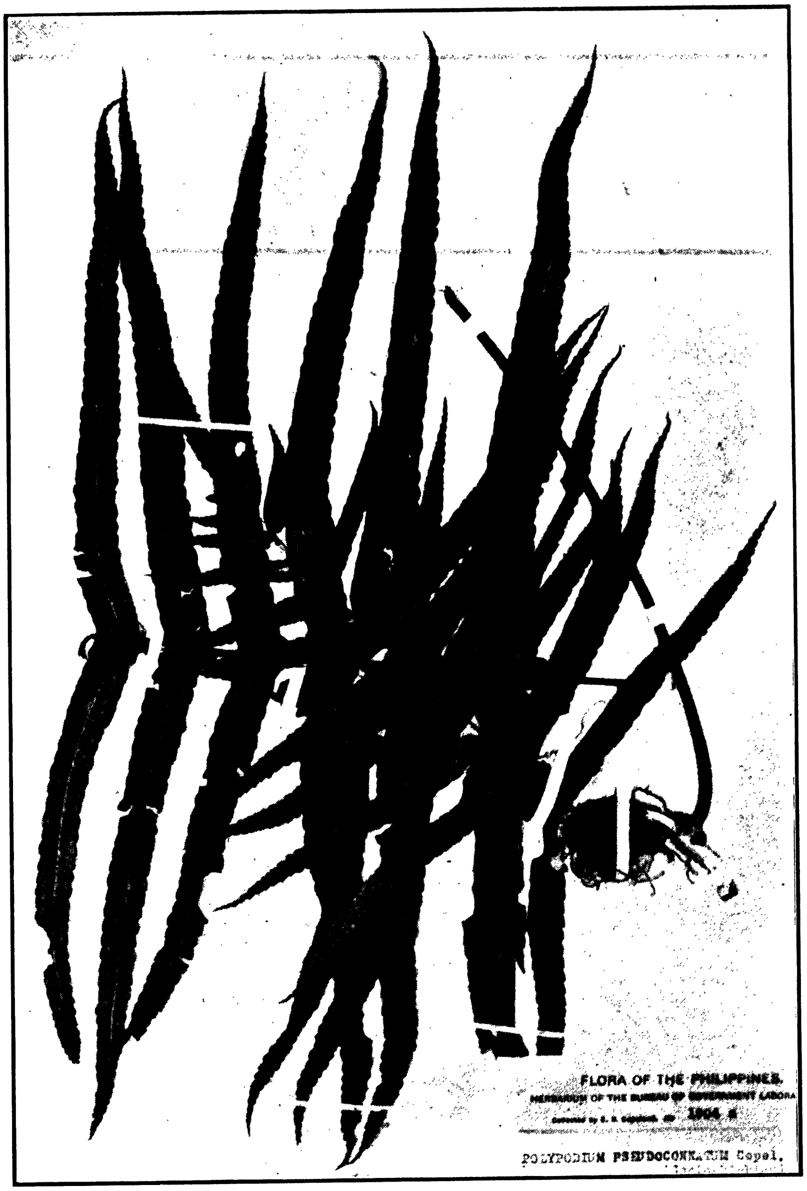
TAB. 19. POLYPODIUM MULTICAUDATUM COPEL.


FLORA OF THE PHILIPPINES.
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORATORIES.
Collected by E. B. Copeland. No. 1527

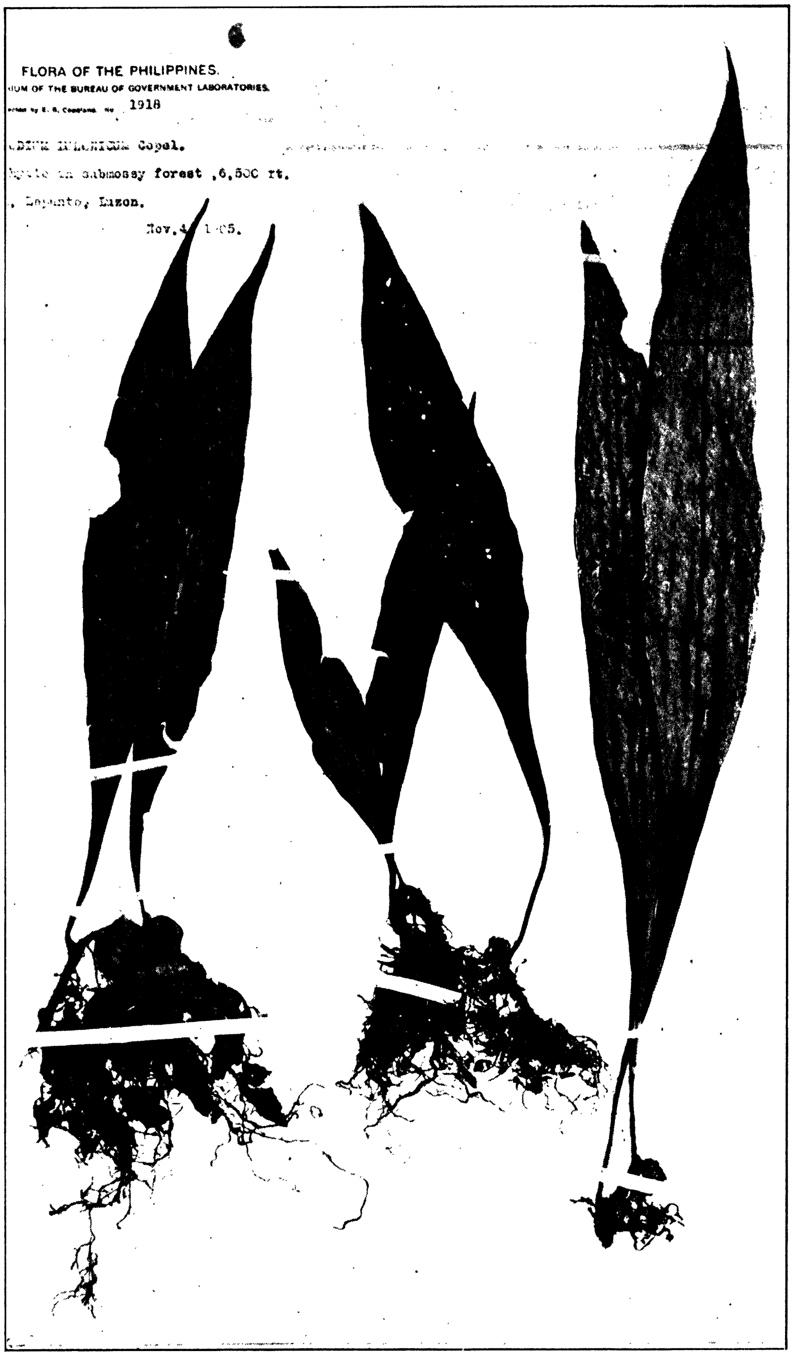
TAB. 20. POLYPODIUM ERYTHROTRICHUM COPEL.


FLORA OF THE PHILIPPINES.
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORATORIES
1829

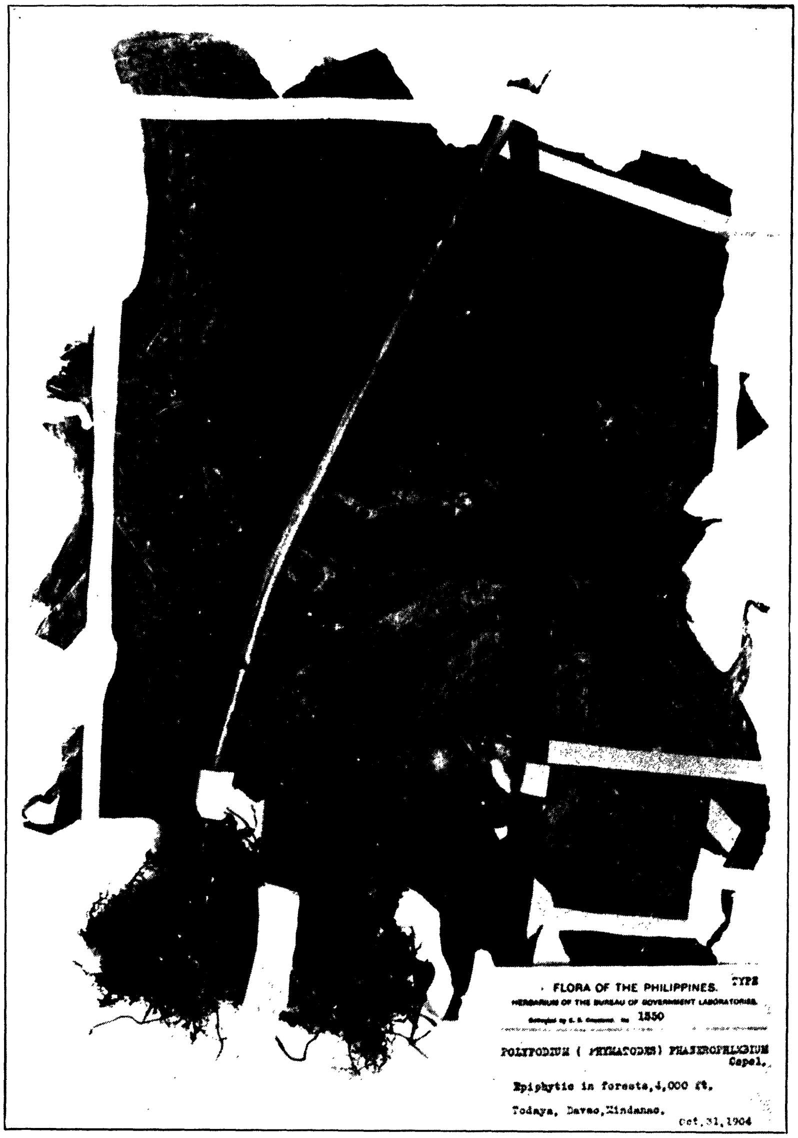
TAB. 21. POLYPODIUM MENGTSEENSE CHRIST.



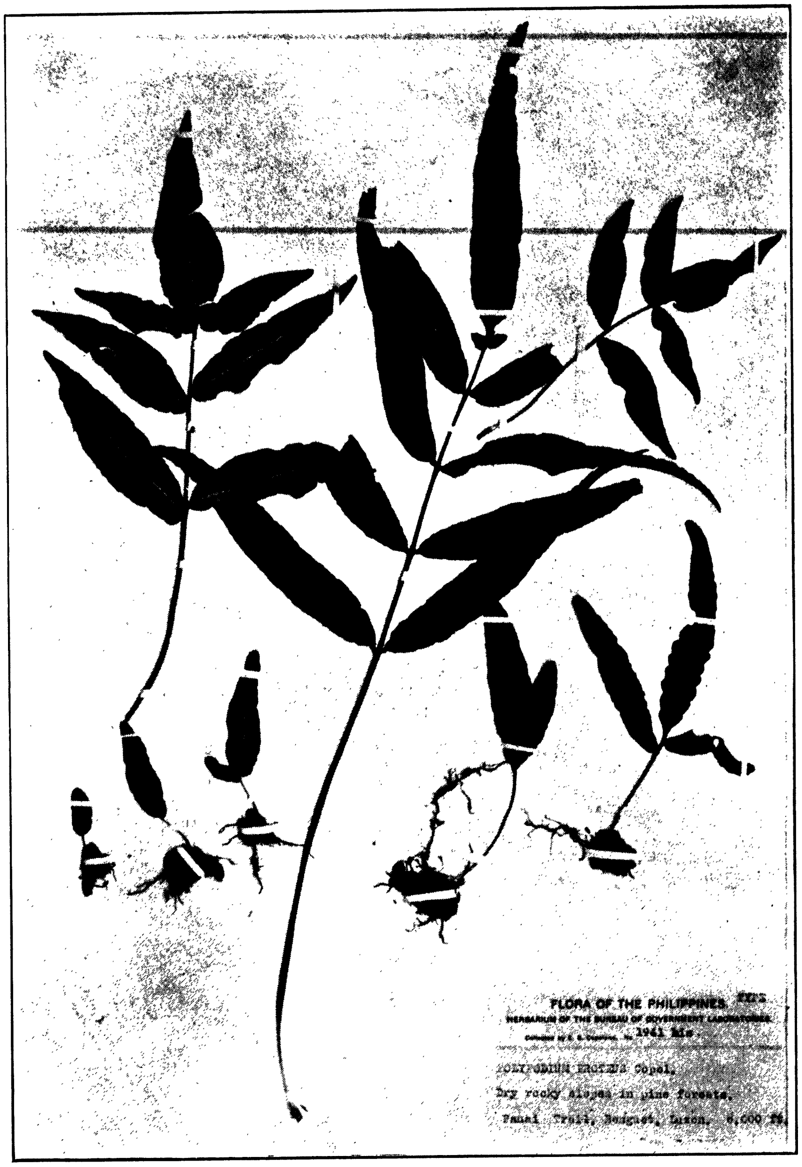
TAB. 22. POLYPODIUM PSEUDOCONNATUM COPEL.


FLORA OF THE PHILIPPINES.
IUM OF THE BUREAU OF GOVERNMENT LABORATORIES.
1918
Copel.
forest ,6,500 ft.
Luzon.
Nov.4

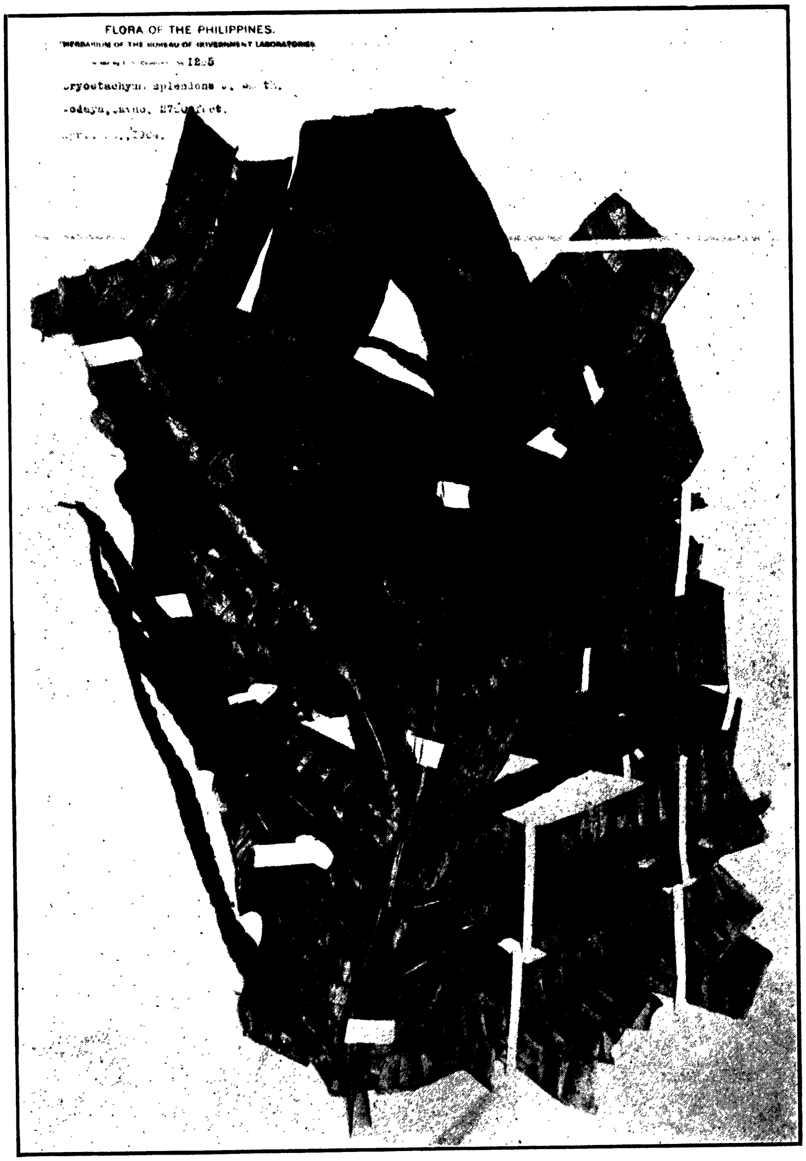
TAB. 23. POLYPODIUM LUZONICUM COPEL.


FLORA OF THE PHILIPPINES.
TYPE
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORATORIES.
1550
POLYPODIUM (PHYMATODES) PHANEROPHLEBIUM Copel.
Epiphytic in forests, 4,000 ft.
Todaya, Davao, Mindanao.
Oct. 31, 1904

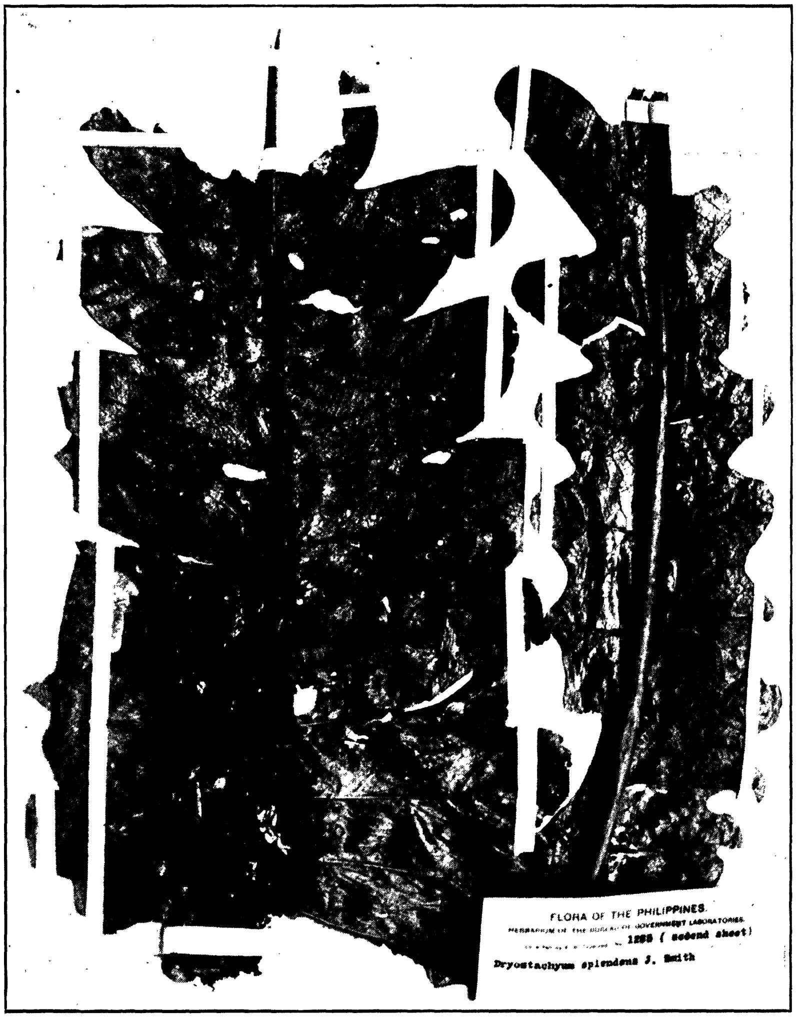
TAB. 24. POLYPODIUM PHANEROPHLEBIUM COPEL.


FLORA OF THE PHILIPPINES.
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORATORIES.
1941 Bis.
POLYPODIUM PROTEUS Copel.
Dry rocky slopes in pine forests.
Pauai Trail, Benguet, Luzon. 6,000 ft.

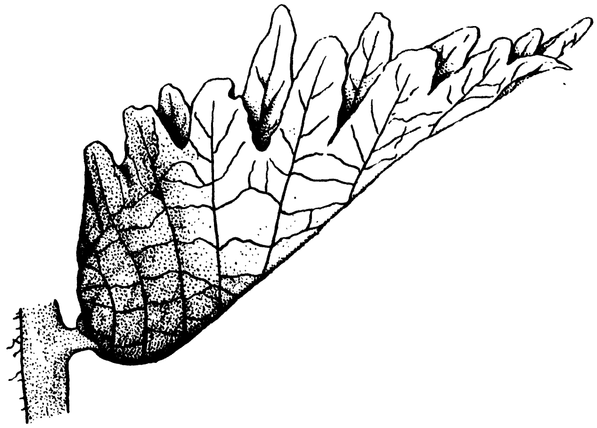
TAB. 25. POLYPODIUM PROTEUS COPEL.



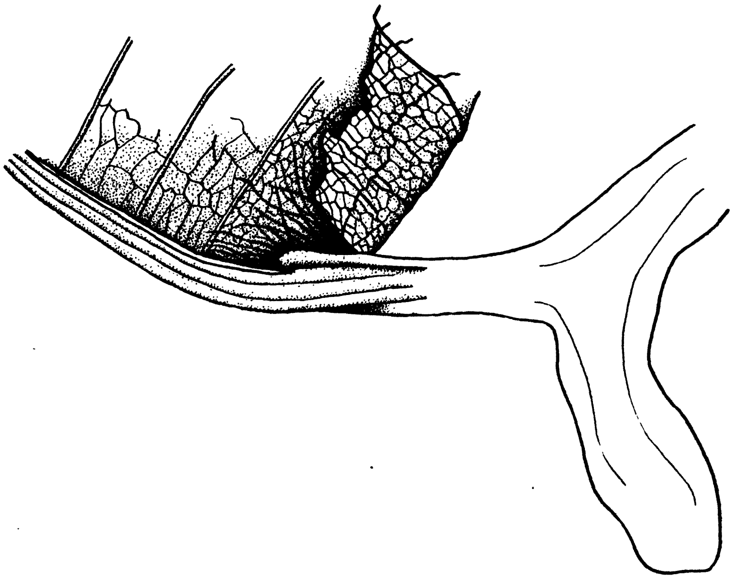
TAB. 26. DRYOSTACHYUM SPLENDENS J. SM.


FLORA OF THE PHILIPPINES.
HERBARIUM OF THE BUREAU OF GOVERNMENT LABORATORIES.
1288 (second sheet)
Dryostachyum splendens J. Smith

TAB. 27. DRYOSTACHYUM SPLENDENS J. SM.



THAYERIA CORNUCOPIA. Small frond, X $\frac{1}{6}$.



THAYERIA CORNUCOPIA. Detail of split base of frond, X 1.

TAB. 28.

THE PHILIPPINE

JOURNAL OF SCIENCE

VOL. I AUGUST 15, 1906 SUPPLEMENT III

NEW OR NOTEWORTHY PHILIPPINE PLANTS, V.

By ELMER D. MERRILL.

(*From the botanical section of the Biological Laboratory, Bureau of Science.*)

INTRODUCTION.

The present article has been prepared as material and data became available, as was the case with the previous papers published under the above title.[1] Our receipts of Philippine botanical material from various sources approximate 5,000 numbers annually and the percentage of undescribed species and interesting forms is very large, as is to be expected in a region botanically so little known as is this Archipelago. In making the preliminary identifications, immediately after the receipt of the material in the herbarium, many of the interesting forms are detected and described, but in this paper, as in the preceding ones of the series, only a portion of these forms are considered. Practically no work in some groups can at present be done in Manila, owing to a lack of literature; in certain ones, all material is submitted to specialists for identification and report. Frequently, specific identifications can not be made at once, because of a lack of complete material, so that several hundred sheets, apparently representing undescribed species, remain in the herbarium of this Bureau and for one reason or another these will need to be considered at a later date. In general, it is not considered good policy to describe species based on a single specimen and many of the apparently undescribed plants at present in our herbarium have no corresponding duplicate material.

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[1] *Publications of the Bureau of Government Laboratories* (1904–5), **6**, **17**, **29**, **35**.

In this paper a large number of genera which were previously unknown from the Philippines are for the first time reported, their representatives in some cases being species heretofore undescribed and, in others, well-known plants which for the first time have been encountered in the Archipelago.

Rolfe[2] makes it clear that the Philippine flora has distinct connections with that of the neighboring lands, but, at the time he wrote, comparatively little was known regarding this flora or that of the regions immediately to the north and south. In the past twenty years much work has been done by various authors; 1905 has seen the completion of Forbes and Hemsley's work on the flora of China,[3] and in 1898 Koorders published his compilation of that of Celebes.[4]

Rolfe, in 1884, knew but three species common to the Philippines and Celebes and confined to these two regions and only about sixteen which he considered to represent northern or continental types; therefore it has been thought advisable here to enumerate some of the more striking representatives both of the southern connection with Celebes and of the northern one with Formosa, Japan, and the Asiatic Continent, especially as Usteri,[5] publishing as recently as the year 1905, has added nothing to the twenty-year-old list of Rolfe.

The list of species confined to Celebes and the Philippines and common to both has been extended from the three mentioned in 1884 to about sixty given below, while many others extending from the Philippines through Celebes to neighboring islands, have been enumerated. The list, so far as Celebes is concerned, is based largely on Koorders' work, cited above. Koorders[6] remarks that the relationship between the Philippine and Celebes flora is very prominent, but does not discuss the connections in detail.

In the following table the cross (+) indicates that the species is found in Luzon and Celebes and, unless noted to the contrary in the last column, that it is known only from the two regions. The dash (—) indicates that the Philippine species is represented in Celebes by a closely related one or a variety. The question mark indicates a Philippine species doubtfully credited to Celebes by Koorders. Where the range of the species is known to extend beyond Celebes, its distribution is given in the last column. Specimens of most of the species enumerated are in the herbarium of this Bureau.

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[2] On the Flora of the Philippine Islands and Its Probable Derivation, *Journ. Linn. Soc. Bot.* (1884), **21**, 283–316.

[3] An Enumeration of All the Plants Known from China Proper, Formosa, Hainan, Corea, the Luchu Archipelago, and the Island of Hongkong, etc., *Journ. Linn. Soc. Bot.* (1886–1905), **23, 26, 36.**

[4] Verslag eener Botanische Dienstreis door de Minahasa, tevens eerste overzicht der Flora van N. O. Celebes, *Meded. 's Lands. Plant.* (1898), **19.**

[5] *Beiträge zur Kenntnis der Philippinen und ihrer Vegetation* (1905), **3.**

[6] *Loc. cit.*, 258.

Table showing floristic relationship between the Philippines and Celebes.

Species.	Philippines.	Celebes.	Other distribution.
POLYPODIACEÆ:			
Polypodium angustatum Blume	+	+	Java.
Polypodium vulcanicum Blume	+	+	Sunda Islands.
Polypodium heracleum Kunze	+	+	Java.
Polypodium setosum Blume	+	+	Java.
Polypodium stenophyllum Blume	+	+	Java.
Polypodium decrescens Christ	+	+	
Lindsaya sarasinorum Christ	+	+	
Lindsaya retusa Mett	+	+	New Guinea.
Callipteris alismaefolia J. Sm	+	+	
Diplazium deltoideum Christ	+	+	
Athyrium sarasinorum var. philippinense Christ	+	—	
Pteris heteromorpha Fée	+	+	
Hymenolepis platyrhynchos Kunze	+	+	
Niphobolus sphaerostichus Copel	+	+	
Aspidium aculeatum var. batjanense Christ	+	+	Batjan.
CYPERACEÆ:			
Cyperus pubisquama Steud	+	+	
ARACEÆ:			
Epipremnum elegans Engl	+	+	
Pothoidium lobbianum Schott	+	+	Moluccas, Ternate.
Scindapsus argyraea Engl	+	+	
Spathiphyllum commutatum Schott	+	+	Amboina.
DIOSCOREACEÆ:			
Dioscorea n. sp	+	+	
MYRICACEÆ:			
Myrica javanica Blume	+	+	Java.
FAGACEÆ:			
Quercus campanoana Vid	+	+	
Quercus blancoi A. DC	+	+	
Quercus celebica Blume	+	+	
ULMACEÆ:			
Celtis philippinensis Blanco	+	(?)	
URTICACEÆ:			
Ficus caulocarpa Miq	+	+	Borneo.
Ficus chrysolepis Miq	+	+	
Ficus clusioides Miq	+	+	
Ficus forstenii Miq	+	+	Timor, Borneo.
Ficus manillensis Warb	+	—	
Ficus minahassae Miq	+	+	
PITTOSPORACEÆ:			
Pittosporum resiniferum Hemsl	+	(?)	
LEGUMINOSÆ:			
Clianthus binnendyckianus S. Kurz	+	+	Ceram (?).
Dalbergia minahassae Prain	+	+	
Gleditschia rolfei Vid	+	+	
Pithecolobium subacutum Benth	+	+	
Pterocarpus echinatus Pers	+	+	
Wallaceodendron celebicum Koord	+	+	
RUTACEÆ:			
Lunasia amara Blanco	+	+	Java.
Micromelum molle Turcz	+	+	
Micromelum tephrocarpum Turcz	+	+	
Evodia latifolia DC	+	+	Halmaheira.

Table showing floristic relationship between the Philippines and Celebes—Continued.

Species.	Philippines.	Celebes.	Other distribution.
BURSERACEÆ:			
Garuga abilo (Blco.) Merr	+	+	Amboina, New Guinea, Samoa.
MELIACEÆ:			
Reinwardtiodendron merrillii Perk	+	—	
Aglaia macrobotrys Turcz	+	+	
Aglaia argentea Blume	+	+	Java.
Aglaia monophylla Perk	+	—	
MALPIGHIACEÆ:			
Ryssopteris dealbata Juss	+	+	
EUPHORBIACEÆ:			
Actephila gigantea Koord	+	+	
Cleistanthus cupreus Vid	+	+	
Mallotus cumingii Muell. Arg	+	+	
Mallotus leucocalyx Muell. Arg	+	+	
Glochidion album Boerl	+	+	
Macaranga hispida Muell. Arg	+	+	Moluccas.
ANACARDIACEÆ:			
Semecarpus perrottetii March	+	+	
Koordersiodendron pinnatum Merr	+	+	New Guinea.
SAPINDACEÆ:			
Cubilia blancoi Blume	+	+	Boeroe, Ceram.
Tristira pubescens Merr	+	—	
ELAEOCARPACEÆ:			
Elaeocarpus cumingii Turcz	+	+	
TILIACEÆ:			
Columbia serratifolia DC	+	+	
STERCULIACEÆ:			
Sterculia oblongata R. Br	+	+	
Sterculia stipularis R. Br	+	(?)	
THEACEÆ:			
Ternstroemia toquian F. -Vill	+	+	
MELASTOMATACEÆ:			
Medinilla cumingii Naud	+	+	
Medinilla teysmannii Miq	+	+	New Guinea.
Astronia cumingiana Vid	+	+	
Memecylon preslianum Triana	+	+	
ARALIACEÆ:			
Tetraplasandra philippinensis Merr	+	—	New Guinea (—).
Anompanax philippinensis Harms	+	—	
Boerlagiodendron pulcherrimum Harms	+	—	
ERICACEÆ:			
Vaccinium microphyllum Blume	+	+	
Rhododendron apoanum Stein	+	—	
MYRSINACEÆ:			
Rapanea avenis Mez	+	+	Java.
SAPOTACEÆ:			
Palaquium celebicum Burck	+	+	
LOGANIACEÆ:			
Couthovia celebica Koord	+	+	
Fagraea plumeriaefolia A. DC	+	+	
Strychnos celebica Koord	+	+	
APOCYNACEÆ:			
Ichnocarpus ovatifolius A. DC	+	+	
Tabernaemontana cumingiana A. DC	+	+	

Table showing floristic relationship between the Philippines and Celebes—Continued.

Species.	Philippines.	Celebes.	Other distribution.
ASCLEPIADACEÆ:			
Dischidiopsis philippinensis Schltr	+	—	New Guinea (—).
CONVOLVULACEÆ:			
Bonamia semidigyna var. farinosa Hallier	+	+	Banca, Lepar.
VERBENACEÆ:			
Geunsia cumingiana Rolfe	+	+	
Premna cumingiana Schauer	+	+	
Clerodendron blancoi Naves	+	—	
ACANTHACEÆ:			
Eranthemum zollingerianum Nees	+	+	
Hemigraphis cumingiana Nees	+	+	
Hemigraphis rapifera Hallier	+	+	
Hemigraphis primulifolia F.-Vill	+	+	New Guinea.
BIGNONIACEÆ:			
Nycticalos cuspidatum Miq	+	+	Moluccas.
CUCURBITACEÆ:			
Momordica ovata Cogn	+	+	

Notes on the above table.—*Dioscorea* sp. nov. is the species enumerated by Koorders as *D. glabra* Roxb., but which is a distinct undescribed one according to Dr. Prain in lit. and which has also been found in the Philippines. *Gleditschia rolfei* Vid.; *G. celebica* Koord., is a synonym. *Pterocarpus echinatus* Pers. (*P. vidalianus* Rolfe) is also known from Salajar Island, south of Celebes.[7] *Wallaceodendron celebicum* Koord., a monotypic genus, first found in Celebes and later discovered in the central Philippines. *Reinwardtiodendron merrillii* Perk., a genus of two species, one Celebes and one Philippine. *Koordersiodendron pinnatum* (Blanco) Merr., a monotypic genus known from the Philippines, Celebes, and New Guinea. *Cubilia blancoi* Blume, a monotypic genus known from Luzon, Celebes, Boeroe, and Ceram, *Cubilia rumphii* Blume being a synonym. *Anompanax philippinensis* Harms., a genus comprising two species, one Celebes and one Philippine. *Vaccinium microphyllum* Blume, see page 221.

Whereas the Celebes connections are very strikingly shown in the above table, the semi-temperate or continental element in the highlands of northern Luzon is nearly as prominent, as is shown by the following one. The latter undoubtedly is far from complete and therefore, when more extensive collections are made and our present material has more thoroughly been worked over with reference to Asiatic types and compared with them, the number of species will undoubtedly be greatly enlarged.

The northern element in the Philippine flora.—In the following table, as in the preceding, the cross (+) indicates that the species is found in Luzon and in the region for which the sign is entered, whereas the dash (—) means that the Philippine species is represented by a closely related form in the region indicated, or, in the last column, that the general generic distribution is northern and not Malayan. The majority of the genera so indicated are unknown from the Malayan region. Specimens of all the species enumerated are in the herbarium of this Bureau.

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[7] Merrill: *Publications of Bureau of Government Laboratories* (1904), **17**, **20**.

Table showing the northern element in the Philippine flora.

Species.	Luzon.	Formosa.	Japan.	China.	Northern India.	Europe.	North America.	Java, Sumatra, or Borneo.	Of general northern generic distribution.
POLYPODIACEÆ:									
Cheilanthes argentea Hook	+		+	+	+				
Aspidium fauriei var. elatius Christ	+		—			—		—	
Polypodium mengsteense Christ	+			+					
Polystichum varium Presl	+		+	+					
Nephrodium erythrosorum Hook	+		+	+	+				
Diplazium japonicum Thunb	+		+	+	+				
GLEICHENIACEÆ:									
Gleichenia laevissima Christ	+			+					
PINACEÆ:									
Pinus insularis Endl	+								—
Pinus merkusii J. et DeVr	+							+	—
GRAMINEÆ:									
Agrostis elmeri Merr	+		—	—				—	—
Calamagrostis filifolia Merr	+								—
Calamagrostis arundinacea var. nipponica Hack	+		+	—	—				—
Poa luzoniensis Merr	+								—
Pollinia quadrinervis Hack	+		+	+	+				
Pollinia nuda Trin	+		+	+	+				
Pollinia imberbis var. willdenowiana Hack	+				+				
Arthraxon microphyllum Hochst	+				+				
Eremochloa leersioides Hack	+			+					
Brachypodium silvaticum Beauv. var. nov	+		—	—	—	—	—		—
Anthoxanthum luzoniense Merr	+				—				—
Coelachne hackeli Merr	+		—	—	—				—
CYPERACEÆ:									
Carex, about 14 species	+								—
JUNCACEÆ:									
Juncus, 2 species	+								—
LILIACEÆ:									
Aletris spicata Franch	+	+	+	+					—
Disporum pullum Salisb	+	+	+	+	+		+		—
Ophiopogon japonicus Salisb	+	+	+	+					—
Lilium philippinense Baker	+								—
PIPERACEÆ:									
Saururus loureirii Decne	+	+		+					—
SALICACEÆ:									
Salix azaolana Blanco	+	—		—	—				—
MYRICACEÆ:									
Myrica rubra S. & Z	+	+	+	+	+			+	—

Table showing the northern element in the Philippine flora—**Continued.**

Species.	Luzon.	Formosa.	Japan.	China.	Northern India.	Europe.	North America.	Java, Sumatra, or Borneo.	Of general northern generic distribution.
URTICACEÆ:									
Chamabainia squamigera Wedd	+				+				—
Debregeasia longifolia Wedd	+				+			+	—
CARYOPHYLLACEÆ:									
Stellaria laxa Merr	+		+	+	+			+	—
RANUNCULACEÆ:									
Ranunculus n. sp	+								—
Anemone luzoniensis Rolfe	+								—
BERBERIDACEÆ:									
Berberis barandana Vidal	+								—
Mahonia nepalensis DC	+		+	+	+				—
CRUCIFEREÆ:									
Cardamine parviflora Linn	+	+	+	+	+	+	+		—
CRASSULACEÆ:									
Sedum australis Merr	+								—
SAXIFRAGACEÆ:									
Astilbe n. sp. (A. rivularis Vid.)	+				—				—
Deutzia pulchra Vid	+								—
Hydrangea lobbii Maxim	+								—
Itea macrophylla Wall	+				+				—
Dichroa febrifuga Lour	+			+	+			+	—
ROSACEÆ:									
Fragaria indica Andr	+	+	+	+	+				—
Rosa multiflora Thunb	+	+	+	+					—
Rubus tagallus Cham. & Sch	+	+		+					—
Rubus rosaefolius Sm	+			+					—
RUTACEÆ:									
Boenninghausenia albiflora Reichb	+	+	+	+	+				—
Skimmia japonica Thunb	+	+	+	—					—
POLYGALACEÆ:									
Polygala glomerata Lour	+		+	+					—
CORIARIACEÆ:									
Coriaria intermedia Mats	+	+	—	—					—
ACERACEÆ:									
Acer philippinum Merr	+								—
Acer sp. indet	+								—
VIOLACEÆ:									
Viola patricinii DC	+		+	+	+				—
MELASTOMATACEÆ:									
Sarcopyramis n. sp	+				—			—	—
OENOTHERACEÆ:									
Epilobium, 2 species	+								—
HALORRHAGACEÆ:									
Halorrhagis scabra, var. elongata Schindl	+			+	—				
ARALIACEÆ:									
Acanthopanax trifoliatum (L.) Merr	+	+	+	+	+				

Table showing the northern element in the Philippine flora—Continued.

Species.	Luzon.	Formosa.	Japan.	China.	Northern India.	Europe.	North America.	Java, Sumatra, or Borneo.	Of general northern generic distribution.
ERICACEÆ:									
Rhododendron, 14 species	+								—
Vaccinium, 10 species	+								—
Gaultheria, 3 species	+								—
MYRSINACEÆ:									
Ambylanthopsis n. sp	+				—				—
PRIMULACEÆ:									
Lysimachia microphylla Merr	+								—
Lysimachia ramosa Wall	+				+			+	—
Androsace saxifragifolia Bunge	+	+	+	+	+				—
SYMPLOCACEÆ:									
Symplocos lancifolia S. & Z	+			+					
OLEACEÆ:									
Fraxinus philippinensis Merr	+			—					—
Ligustrum cumingianum Decne	+								—
GENTIANACÆ:									
Gentiana, 3 species	+								—
Crawfurdia luzoniensis Vid	+								—
HYDROPHYLLACEÆ:									
Ellisiophyllum reptans Maxim	+		+						—
BORRAGINACEÆ:									
Bothriospermum tenellum F. & M	+	+	+	+	+				—
Trigonotis philippinensis Merr	+								—
VERBENACEÆ:									
Callicarpa formosana Rolfe	+	+	+	—					—
LABIATÆ:									
Ajuga n. sp	+								—
Plectranthus diffusa Merr	+								—
Plectranthus sp	+								—
Scutellaria luzonica Rolfe	+	+	—	—	—				—
SCROPHULARIACEÆ:									
Alectra dentata O. Ktze	+			+	+				—
Euphrasia borneensis Stapf	+							+	—
Sopubia trifida Ham	+			+	+				—
RUBIACEÆ:									
Galium philippinensis Merr	+								—
CAPRIFOLIACEÆ:									
Lonicera rehderi Merr	+								—
Lonicera philippinensis Merr	+								—
Viburnum luzonicum Rolfe	+								—
Viburnum odoratissimum Ker	+		+	+	+				—
Viburnum sinuatum Merr	+								—
CAMPANULACEÆ:									
Lobelia nicotianaefolia Heyne	+				+				—
Pratia begoniaefolia Lindl	+	+	+	+				+	—
Peracarpa n. sp	+				—				—

Table showing the northern element in the Philippine flora—Continued.

Species.	Luzon.	Formosa.	Japan.	China.	Northern India.	Europe.	North America.	Java, Sumatra, or Borneo.	Of general northern generic distribution.
COMPOSITÆ:									
Aster, 2 species	+								—
Artemesia parviflora Roxb	+				+				—
Ainslaea reflexa Merr	+			—	—			—	—
Carpesium cernuum Linn	+			+	+	+			—
Cnicus wallichii Clarke	+				+				—
Dichrocephala chrysanthemifolia DC	+			+	+				—
Anaphalis cinnamomea Clarke	+		+	+	+		—		—
Gnaphalium, 3 species	+								—
Eupatorium lindleyanum DC	+	+	+	+					—
Lactuca thunbergiana Maxim	+	+	+	+					—
Lactuca brevirostris Champ	+		+	+					—
Myriactis humilis Merr	+								—
Senecio, 5 species	+								—
Solidago virgaurea L	+	+	+	+	+	+	+		—
Vernonia philippinensis Rolfe	+	—		—					

Notes on the above table.—*Chamabainia squamigera*, a monotypic Asiatic genus. *Sedum australis* is the most southern species of the genus known in the Eastern Hemisphere. *Polygala glomerata:* This species is included, but the specimen referred to is from Mindanao, not as yet having been found in Luzon. Several other species of *Polygala* are known from the Philippines. *Viola patricinii:* Three other species of *Viola* are represented in material recently collected in northern Luzon, one of these has also been found in Mindanao. *Sarcopyramis* is a monotypic Himalayan genus, the Luzon plant apparently representing an undescribed form. *Epilobium:* One or both forms may be undescribed. *Rhododendron* and *Vaccinium* include the total species known from the Philippines. *Ambylanthopsis*, an Asiatic genus of two species from Bhotan and Assam, a third undescribed species in Luzon. *Ellisiophyllum reptans* is a monotypic genus previously known only from Japan. *Peracarpa*, an undescribed form, the genus previously containing but one Himalayan species. *Solidago virgaurea:* This is its most southern range in the Eastern Hemisphere.

PANDANACEÆ.

FREYCINETIA Gaudich.

Freycinetia rostrata Merrill sp. nov. § *Pleiostigma.*

A scandent, glabrous plant with terminal, globose heads, usually in threes, and broadly-lanceolate, somewhat acuminate leaves 6 to 11 cm. long, the margins with very few scattered small teeth. Branches brownish gray, 5 mm. or less in diameter, obscurely angled. Leaves 1.5 to 2.4 cm. wide, narrowed below to the short flattened petiole, the margins often recurved, nearly or quite entire below, above with few small scattered teeth which are not spine-like. Heads about 1.5 cm. in diameter, globose, the peduncles from the apices of the branches 1 to 1.5 cm. long. Drupes many, but most of them aborted, narrowly ovoid, about 8 mm. long, narrowed above into a rostrate apex about 2 mm. long. Stigmas 4.

MINDANAO, Lake Lanao, Camp Keithley (475 *Mrs. Clemens*) April, 1906.

PANDANUS Linn.

Pandanus clementis Merrill sp. nov. § *Sussea*. (Pl. 1.)

A tree about 10 m. high, branched above, with ovoid, 3 to 4.5 cm. long heads, arranged in terminal condensed spikes, about 8 heads in each spike. each head subtended by a large broadly-ovate to oblong-ovate, acute or very shortly abruptly acuminate bract, the drupes indefinite, 10 to 12 mm. long. Ultimate branches about 1.5 cm. in diameter. Leaves 60 cm. long or more, 2 to 2.5 cm. wide, the margins with small antrorse spines throughout, the midrib above glabrous, beneath at the base with a few retrorse spines and near the apex finely antrorsely denticulate, the apex short acuminate. Heads red when mature, ovoid, obtuse, obscurely obtusely 3-angled, 3 to 4.5 cm. long, 2.5 to 3 cm. in diameter, the bracts gradually smaller upwards, 4 to 6 cm. long, 3 to 4 cm. wide, acute or very shortly acuminate, serrulate on the keel and margins above. Drupes very many in each head, 10 to 12 mm. long, 3 to 4 mm. thick above, gradually narrowed below, somewhat angular, the apical portion convex, slightly ribbed. Stigma terminal, central, 1 to 1.5 mm. in diameter.

MINDANAO, Lake Lanao, Camp Keithley (*Mrs. Clemens*) March, 1906. Altitude about 800 m.

GRAMINEÆ.

ANTHOXANTHUM Linn.

Anthoxanthum luzoniense Merrill sp. nov.

Erect, glabrous, 40 to 60 cm. high, very fragant in drying. Culms glabrous; nodes slightly pubescent with short appressed hairs; sheaths usually exceeding the internodes, often loose, the margins above slightly pubescent; ligule broad, ovate, obtuse, irregularly cleft or lacerate, hyaline, about 4 mm. long; blades 11 to 18 cm. long, 4 to 5 mm. wide, glabrous, smooth, flat or revolute when dry. Panicles exserted, rather dense, many flowered, 6 to 8 cm. long, 1 to 1.5 cm. in diameter, the lower branches about 3 cm. long, appressed-ascending, densely flowered. First glume hyaline except the median portion, ovate, acuminate, 3 to 4 mm. long, 1-nerved; second glume 5 to 6 mm. long, 3-nerved, glabrous, oblong ovate, abruptly subtruncate-acuminate. Flowering glumes 3, the first and second neuter, slightly pubescent, the first about 5 mm. long, 3-nerved, cleft at the apex for about $\frac{1}{4}$ its length, awned in the cleft, the awn scabrous, straight, about 1.2 mm. long; second flowering glume

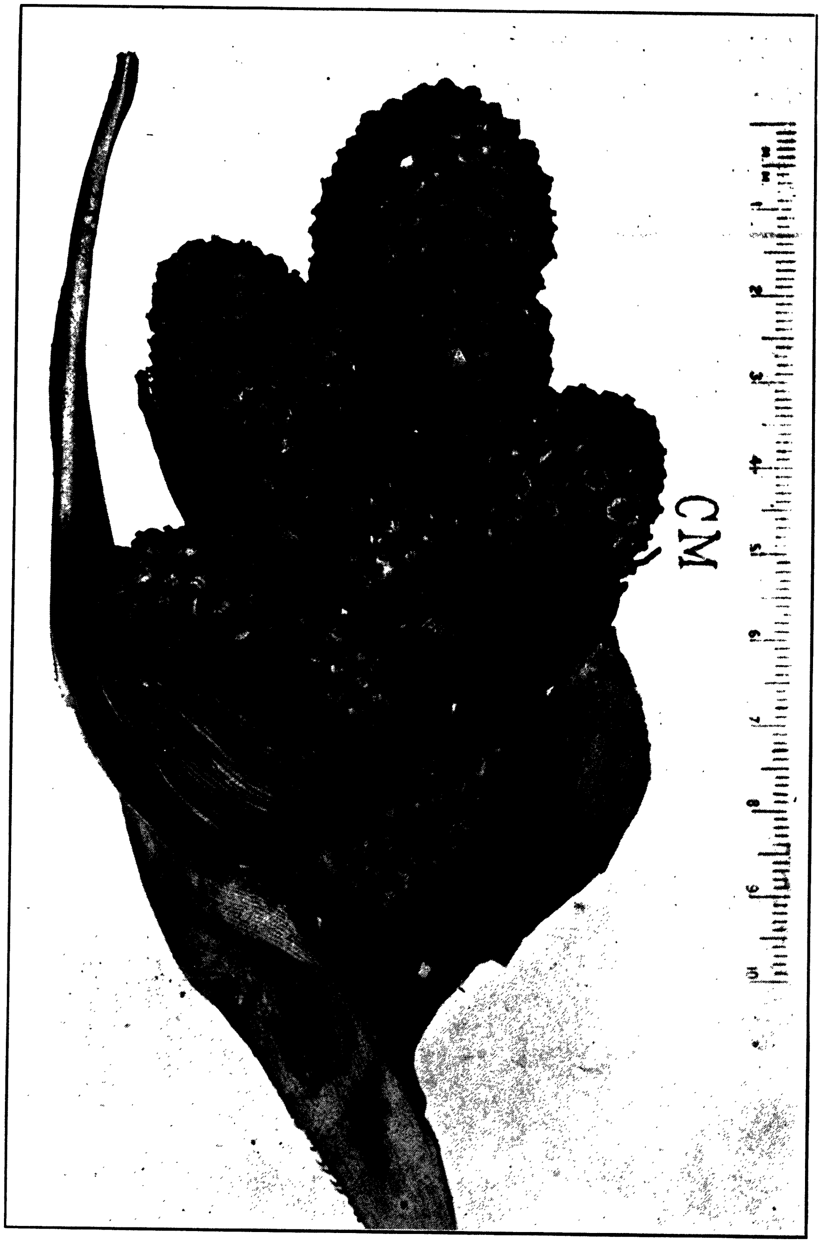

PLATE I. PANDANUS CLEMENTIS MERR.

about 4 mm. long, oblong, 1-nerved, cleft at the apex, awned from the back at the lower ¼, the awn straight, scabrous, about 6 mm. long; third flowering glume broadly-ovate, obtuse, hyaline, glabrous, nerveless or nearly so, hermaphrodite, inclosing a very narrow palea. Anthers narrowly oblong, about 2 mm. long.

LUZON, Province of Benguet, Pauai (4713 *Merrill*) November 8, 1905.

In the same locality and with the same associates as *Poa luzoniensis*, and like that species a very interesting northern type. Hackel, who has kindly examined specimens, states that this species is apparently related to the British Indian plant described by Hooker as *Hierochloa clarkei*, judging from the description. The present species differs from the well-known and widely distributed *Anthoxanthum odoratum* Linn., in its glabrous outer glumes and especially in the very short-awned first-flowering glume. It has the same characteristic odor and much the appearance of that species.

ARUNDINELLA Raddi.

Arundinella setosa Trin. Diss. **2** (1824) 63; Hook. f. Fl. Brit. Ind. **7** (1897) 70. *Danthonia luzoniensis* Steud. Syn. Pl. Gram. (1855) 245; Miq. Fl. Ind. Bat. **3** (1859) 427; Vidal, Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 282; Ceron Cat. Pl. Herb. (1892) 184; F.-Vill. Nov. App. (1883) 319.

PHILIPPINES (1415 *Cuming*) cotype of *Danthonia luzoniensis* Steud. LUZON, Province of Benguet, Pauai to Baguio (4702 *Merrill*) November, 1905; Bued River (4271 *Merrill*) November, 1905.

British India to Cochin China, and southern China.

This species is enumerated here only to call attention to the reduction of *Danthonia luzoniensis* Steud. On receipt of a specimen of No. 1415 *Cuming*, from the British Museum, I found the number to be an *Arundinella* and not a *Danthonia*. A fragment was sent to Dr. Hackel, who pronounced it to be identical with *Arundinella setosa* Trin. The genus *Danthonia* can therefore be excluded from the Philippines.

CALAMAGROSTIS Adans.

Calamagrostis filifolia Merrill sp. nov. § *Deyeuxia*.

A densely tufted, erect grass 30 to 60 cm. high, with filiform leaves, and strict, densely flowered panicles. Culms glabrous, many in each tuft, erect, straight, glabrous; nodes dark, glabrous; sheaths, at least the lower ones, shorter than the internodes, the upper one often inclosing the immature panicles; ligule about 2 mm. long, subhyaline, irregularly cleft or lacerate; blades 10 to 20 cm. long, numerous at the base of the culms and on the innovations, erect, somewhat stiff, revolute, 1 mm. wide or less. Panicles at length exserted, pale green or slightly purplish, many flowered, the lower branches appressed, often 4 cm. long, forming a narrow somewhat spikelike, uninterrupted panicle. Empty glumes subequal, lanceolate, acuminate, about 6 mm. long, both 1-nerved, scabrous on the keel. Flowering glume lanceolate, 5 mm. long, minutely scabrous, 4-nerved, the nerves green, entire or very obscurely 2 to 3 toothed at the apex. Palea equaling the glume. Anthers 1.2 to 1.5 mm. long. Lodicules 1 mm. long. Callus hairs 1 mm. long or less; rhachilla about

1.2 mm. long, the hairs 2 mm. long or less. Awn of the flowering glume inserted at about the lower fourth, 7 mm. long, scabrid, somewhat geniculate and twisted below the geniculation.

LUZON, Province of Benguet, Mount Tonglon (4839 *Merrill*) November 12, 1905. In dry open soils at the summit of the mountain at about 2,250 m. Hackel states that this species is closely related only to *Calamagrostis nardifolia* (Griseb.) Hack. (*Agrostis nardifolia* Griseb.) of the Argentine Andes. A New Zealand species *Calamagrostis* (*Deyeuxia*) *setifolia* has similar leaves but quite other inflorescence and spikelets.

Hackel has suggested the name *Calamagrostis filifolia* forma *cleistogama* for specimens No. 4537 and 4715 *Merrill*, the former from Mount Data, Lepanto, and the latter from Pauai, Benguet, the specimens differing from typical *C. filifolia* in having the 0.5 mm. long anthers persisting with the ripening fruit within the closed glumes and palea and lodicules 0.7 mm. long.

If we exclude *Deyeuxia quadriseta* Benth., credited to the Philippines by F.-Villar, and undoubtedly not a Philippine plant, the identification apparently having been erroneous, then the above species is the first one of the genus to be reported from the Philippines, the genus in general being a northern one, or at least characteristic of the more temperate regions.

POA Linn.

Poa luzoniensis Merrill sp. nov.

An erect perennial grass from long rootstocks, not at all tufted. Culms 30 to 40 cm. high, glabrous, smooth, geniculate below; nodes glabrous; sheaths equaling or shorter than the internodes, rather loose, the lower ones dry and brown; ligule short, truncate, cartilaginous; blades 8 to 14 cm. long, 1.5 to 2.5 mm. wide, flat, thin, glabrous, somewhat acuminate. Panicles lax, comparatively few flowered, slightly exserted, about 9 cm. long, the branches few, whorled, ascending or spreading-ascending, the longer ones 3 cm. or less, filiform, each bearing few spikelets. Spikelets about 3.5 mm. long, green or purplish, the pedicels 2 mm. long or less; first glume lanceolate, acuminate, about 2.1 mm. long, 1-nerved, slightly scabrous on the keel; second glume similar to the first but nearly 3 mm. long and 3-nerved. Flowering glumes 3, ovate, acute, 5-nerved, about 3 mm. long, slightly silky hairy on the keel below, otherwise glabrous, the paleas narrow, hyaline, about 2.5 mm. long, the rachilla glabrous.

LUZON, Province of Benguet, Pauai (4712 *Merrill*) November 8, 1905.

This species was found in a large, open, natural meadow along the borders of a cold stream at an altitude of about 2,100 m., being very rare in the locality, and associated with *Calamagrostis, Brachypodium, Bromus, Anthoxanthum luzoniense, Agrostis elmeri, Ranunculus* sp., *Viola* sp., various species of *Carex* and other northern types. Single, scattered specimens only were found, the rhizomes creeping rather extensively and generally rooting at the lower nodes. This decidedly northern type is an interesting addition to the known boreal element in the flora of northern Luzon, being the first native species of the genus to be reported from the Philippines. Dr. Hackel, to whom specimens were sent, states that it may be most closely related to the widely distributed *Poa pratensis* Linn.

Poa annua Linn. Sp. Pl. (1753) 68; F.-Vill. Nov. App. (1883) 322.

LUZON, Province of Benguet, Bued River (4288 *Merrill*) November 14, 1905, altitude 1,200 m.

This species was reported from the Philippines by F.-Villar, who states that he saw living specimens in Luzon and Panay. I have never seen specimens of this grass from regions at low elevations in the Philippines, and it is possible that F.-Villar's record was based on an erroneous identification. *Poa annua* was found along the new Benguet road near some of the construction camps, the seeds undoubtedly having been introduced in American hay, used for food for the horses and mules utilized in the construction work. It was well established, and will undoubtedly persist.

Among other weedy plants collected on the same trip which were certainly introduced by the same means are *Trifolium pratense* Linn., *T. repens* Linn., *Cerastium vulgatum* Linn., *Spergula arvensis* Linn., *Rumex acetosella* Linn., and *Rumex crispus* Linn. All of these plants were found in cultivated places or in waste lands near construction camps, and some of them will undoubtedly persist. With the exception of *Rumex acetosella* Linn., none of the above species have previously been reported from the Philippines. *Trifolium pratense* Linn., has also been collected in Mindanao, Camp Keithley (*Mrs. Clemens*), April, 1906.

FLAGELLARIACEÆ.

JOINVILLEA Gaudich.

Joinvillea malayana Ridley, Journ. Straights Branch Roy. As. Soc. 44 (1905) 199.

PALAWAN, Balsajan River (575 *Foxworthy*) March 3, 1906. In clearings in forests at an altitude of about 650 m. Malayan Peninsula and Borneo.

No species of this small genus has previously been discovered in the Philippines, the above specimen agreeing perfectly with authentic material of *Joinvillea malayana* in the Herbarium of this Bureau, received from the Botanic Garden, Singapore, collected at Perak. The species was described from material collected in Perak and Selangor, Malayan Peninsula, and Mount Matang, Sarawak, British North Borneo.

As noted by Ridley, this form is most closely related to one of the Hawaiian species, there being two of the genus known from Hawaii, and one from New Caledonia. For parallel distribution Ridley cites only the genus *Cyrtandra* of the *Gesneriaceæ*, which reaches its maximum development in the Sandwich Islands, extending to the Malayan Archipelago and Peninsula. For the Philippines a parallel case of distribution is represented by *Tetraplasandra philippinensis* Mer. of the *Araliaceæ* (see p. 219). In this very characteristic genus, one species is known from the Island of Palawan in the Philippines, one from New Guinea, one from Celebes, and six from the Hawaiian Islands. Another case is represented by the genus *Schistostege* Hillebr., of the *Polypodiaceæ*, of its three known species, one being from Hawaii and two from the Island of Mindanao, southern Philippines.[8] Rolfe[9] cites *Asplenium persicifolium* J. Sm., as being confined to the Philippines and Hawaii, but this species is apparently endemic in the Philippines, as Hillebrand[10] considers the Hawaiian form distinct from *A. persicifolium*.

[8] Copeland: *Philip. Journ. Sci.* 1 (1906), *Suppl.* 155.

[9] Rolfe: *Journ. Linn. Soc. Bot.* 21 (1884), 397.

[10] Hillebrand: *Fl. Hawaiian Isl.* (1888), 591.

LILIACEÆ.

ALETRIS Linn.

Aletris spicata (Thunb.) Franch. Journ. de Bot. **10** (1896) 199. *Hypoxis spicata* Thunb. Fl. Jap. (1825) 136. *Aletris japonica* (non Thunb.) Lamb. Trans. Linn. Soc. **10** (1811) 407; C. H. Wright in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1903) 76.

LUZON, Province of Benguet, Bugias (4685 *Merrill*) October 28, 1905; Pauai to Baguio (4801 *Merrill*) November 9, 1905.

Widely distributed in the highlands of Benguet Province, but not abundant, growing on dry grassy slopes in thin pine forests 1,200 to 2,000 m. An interesting addition to our knowledge of the northern element in the Philippine flora. Japan and the Corean Archipelago to Central and Southern China and Formosa.

DISPORUM Salisb.

Disporum pullum Salisb. Trans. Hort. Soc. **1** (1812) 331; Wright in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 142.

LUZON, District of Lepanto, Mount Data (4857 *Merrill*) November, 1904. No species of the genus has previously been reported from the Archipelago. It is an interesting addition to the northern element in the Philippine flora. Not abundant in the mossy forest at an altitude of about 2,200 m., the specimens in fruit only. Japan to Formosa, China and temperate Himalaya, Java and Sumatra.

SALICACEÆ.

SALIX Linn.

Salix azaolana Blanco, Fl. Filip. ed. 2 (1845) 539; ed. 3, **3** (1879) 188; Merr. Govt. Lab. Publ. **27** (1905) 81. *Salix tetrasperma* Llanos (non Roxb.?) Mem. Ac. Cienc. Mad. (1858); Fl. Filip. ed. 3, **4** (1880) 106; F.-Vill. Nov. App. (1883) 210.

LUZON, Province of Rizal, Bosoboso (1987, 2139 *Ahern's collector*) November, December, 1904, the former with staminate flowers, the latter with mature fruits.

Blanco's description of this species is very short and imperfect, and a translation follows:

Salix (err. typ. *Salis*) **azaolana, Azaola's willow.** Leaves alternate, incised, serrate, attenuate at the apex, glabrous. Flowers dioecious. *Staminate flowers in aments. Calyx bifid. Stamens more than 12 (Azaola). Anthers globose. *Pistillate flowers. Calyx as in the male. Achene one.=*A tree, the trunk as thick as a man's body and which is found along the margins of rivers in Calumpit.* (Province of Bulacan, Luzon.) *Given to knowledge by P. Llanos.* *Tiaun.

Llanos, followed by F.-Villar, reduced this species to *Salix tetrasperma* Roxb., the latter adding that he had seen specimens sent to him by Llanos and also that he had seen living specimens at Quingua, Province of Bulacan, Luzon.

There is little doubt but that the specimens cited above represent Blanco's species, although his description is very imperfect; so far the only one of the genus known from the Philippines and one not previously collected except by Llanos and F.-Villar, no material of these early collections being preserved. Although Blanco cites Calumpit as the locality from which his material came, it seems probable that it was only sent to him from that town, having been collected at some other locality. During a recent trip up the Pampanga River, a stop of several days was made at Calumpit, and a careful search failed to reveal the plant and I could find no natives who knew the word "Tiaun" as a plant name. However, as the country for many miles about Calumpit is under rather close cultivation, it is apparent that the original vegetation of the region has almost entirely been removed.

MORACEÆ.

FICUS Linn.

Ficus anomala Merrill sp. nov. § *Palaeomorphe.*

A tree about 10 m. high with elliptical-ovate, abruptly short acuminate scabrous leaves, the receptacles globose to obovoid, yellow, scabrous, in large fascicles on the trunk and larger branches. Branches brownish gray, glabrous, the branchlets also glabrous except at the slightly ciliate tips. Leaves submembranous, 10 to 16 cm. long, 6 to 11 cm. wide, slightly shining, harsh on both surfaces but not pubescent, the margins subentire or very obscurely undulate-crenate, the base broad, rounded, truncate or somewhat cordate, often somewhat inequilateral, the basal nerves 5 to 7, the outer ones short; primary lateral nerves about 7 on each side of the midrib, prominent, the reticulations distinct, lax, subparallel; petioles 3 to 7 cm. long. Receptacles very numerous, often nearly concealing the trunk and larger branches, in usually large fascicles of short, stout, congested 1 to 2 cm. long branchlets, yellow when mature, scabrous, nearly 2 cm. in diameter when fresh, considerably smaller when dry, the pedicels ebracteolate, 1 to 2 cm. long. Male flowers numerous near the ostiole, monandrous and with a rudimentary ovary, the perianth segments 4, free, enclosing and exceeding the stamen, oblong, about 2 mm. long, slightly ciliate above. Filament stout, about 1 mm. long; anther elliptical-ovoid, 1 mm. long. Rudimentary ovary less than 1 mm. long. Gall flowers numerous, the perianth lobes 4, free, linear, blunt, ciliate above, much exceeding the ovary which is elliptical ovoid, 1.5 mm. long, the style less than 1 mm. long, lateral. Fertile female flowers not seen.

LUZON, Province of Rizal, Montalban (5075 *Merrill*), March 10, 1906. A tree about 10 m. high and 30 cm. in diameter growing along small streams in thickets at an altitude of about 40 m. Anomalous for the section *Palaeomorphe* in that the receptacles are not axillary but borne in large fascicles on the trunk and branches as in many species of the sections *Covellia* and *Neomorphe.*

PARATROPHIS Blume.

Paratrophis caudata Merrill sp. nov.

A small tree about 8 m. tall, the young branches puberulent or glabrous, green, slender. Leaves broadly oblong-lanceolate or oblong-oblanceolate, submembranous, glabrous, shining, the base obtuse, the apex abruptly caudate-acuminate, the acumen obtuse, above with scattered minute white glands, the margins irregularly crenate-serrate, 7 to 17 cm. long, 2 to 5.5 cm. wide; nerves 7 to 8 on both sides of the midrib, prominent beneath, anastomosing; petioles 1 to 2.5 mm. long. Staminate inflorescence axillary, solitary, spicate, amentiform, 4 to 6 cm. long, white, densely many flowered, the rhachis puberulent with minute hairs. Perianth 4-parted, the segments oblong-ovate, obtuse, about 1.5 mm. long. Stamens 4; filaments inflexed in bud, exserted in anthesis, 2 to 3 mm. long; anthers about 1 mm. long. Pistillate inflorescence axillary, spicate, short, 1 to 1.5 cm. long, few (about 8) flowered, the rhachis puberulent. Perianth 4-parted, the segments imbricate, subequal, oblong-ovate, obtuse, 1.7 to 2 mm. long. Ovary sessile, oblong, exserted, 1-celled, glabrous; style 2 mm. long, bipartite for two-thirds its length.

MINDANAO, District of Davao (278 *DeVore & Hoover*), April, 1903. BASILAN (2446 *Hutchinson*) December, 1905. "Common in forests above 15 m." *Hutchinson*. Bagobo *Hulas*, in Basilan *Olis*.

A species characterized by its comparatively short inflorescence and caudate-acuminate leaves, the margins of which are entire below and more or less irregularly crenate-serrate above.

URTICACEÆ.

CHAMABAINIA Wight.

Chamabainia squamigera (Wall.) Wedd. in DC. Prodr. **16** (1869) 218. *C. cuspidata* Wight; Hook. f. Fl. Brit. Ind. **5** (1888) 580; C. H. Wright in Forbes & Hemsl. Journ. Linn. Soc. Bot. **26** (1899) 489.

LUZON, District of Lepanto, Mount Data (4556 *Merrill*) November 4, 1905. In the mossy forest at about 2,250 m. Western China to Northern India south to Ceylon.

An interesting case of geographical distribution, no species of the genus having previously been reported from the Philippines. So far as I am able to determine from descriptions alone, the Philippine form is not distinct from the Asiatic species to which it is here referred.

LORANTHACEÆ.

LORANTHUS Linn.

Loranthus ahernianus Merrill sp. nov. § *Dendropthoë*.

Shrubby, branched, glabrous except the somewhat furfuraceous inflorescence. Branches glabrous, rugose, lenticellate, reddish brown when dry, rather slender. Leaves opposite, glabrous, coriaceous, pale when dry, dull, ovate to oblong ovate, the base rather broad, rounded or obtuse, the apex acuminate, 6 to 10 cm. long, 2.5 to 5 cm. wide, the midrib prominent, the lateral nerves very irregular, obscure, petioles 1 cm. long. Inflorescence of solitary, axillary, lateral and terminal racemose panicles 6 to 8 cm. long, rather many flowered, the axis and short branches furfuraceous, the 1.5 to 2 cm. long peduncles subtended by a whorl of small imbricated bracts, the branches mostly above the middle, about 5 mm. long, each usually three flowered, the middle flower sessile, the two lateral ones pediceled. Flowers slender, tubular, about 3.5 cm. long, yellow, slightly enlarged below and at the apex, the subtending bracts ovate, that of the sessile flower acuminate, 4 mm. long, those of the lateral pediceled flowers smaller and often acute, the pedicels of the lateral flowers 3 to 4 mm. long. Calyx cylindrical, 4 mm. long, glabrous, the limb extended somewhat beyond the ovary, truncate or obscurely 6-toothed. Corolla about 3 cm. long, glabrous, the lobes linear, united for the lower 0.5 cm., the filaments inserted at about the middle, 9 mm. long, inappendiculate; anthers linear oblong about 5 mm. long.

LUZON, Province of Rizal, Bosoboso (2140 *Ahern's collector*) December 15, 1904. A species apparently related to *Loranthus viridis* Merr., but differing in many characters.

Loranthus cauliflorus Merrill sp. nov. § *Stemmatophyllum, Arthrostemma.*

Shrubby, glabrous throughout, the flowers arranged along one side of the branches below the leaves on very short usually trianthous peduncles. Branches dark brown, terete, glabrous, lenticellate. Leaves opposite, coriaceous, 18 to 25 cm. long, 6 to 8 cm. wide, oblong-ovate to ovate-lanceolate, dull, minutely densely wrinkled when dry, the base acute, the apex acuminate; nerves about 5 on each side of the midrib, ascending; petioles stout, 2 to 2.5 cm. long. Flowers rather numerous, red, the peduncles stout, 2 mm. long or less, each bearing three, sometimes but two or one, sessile flowers, each flower subtended by a broadly ovate basal bract about 2.5 mm. long. Calyx cylindrical, 3 mm. long, the limb short, truncate. Petals 5, free, 2 to 2.4 cm. long, linear, 2 mm. wide below, free, narrowed above, the recurved portion above the insertion of the stamen about 8 mm. long. Anthers about 7 mm. long, sessile or subsessile.

MINDANAO, Lake Lanao, Camp Keithley (55 *Mrs. Clemens*) January, 1906. A very characteristic species, at once recognizable by its peculiar inflorescence, the flowers being borne along one side of the branches below the leaves.

Loranthus clementis Merrill sp. nov. § *Dendropthoë.*

Shrubby, glabrous throughout except the slightly puberulent flowers and inflorescence. Branches brownish gray, stout, terete, with numerous small lenticels. Leaves coriaceous, ovate to oblong-ovate, alternate, the base acute, the apex obtuse, dull when dry, 8 to 12 cm. long, 4 to 6.5 cm. wide, with two pairs of stout nerves from near the base of the leaf, the upper pair extending nearly to the apex, the reticulations lax. Flowers slender, somewhat curved, 2.5 to 3 cm. long, 2 to 5 racemosely disposed on each short peduncle, the peduncles numerous, fascicled in the axils of the leaves. Calyx cylindrical, nearly 3 mm. long, somewhat ferruginous puberulent, the limb produced above the ovary nearly 1 mm., 5-toothed, the basal bract narrowly ovate, acute, about 1.5 mm. long, the pedicel 1 to 2 mm. long. Corolla slender, somewhat curved, slightly inflated above, the tube long, red and yellow, grayish or brownish scurfy puberulent outside, the lobes 5, 10 to 12 mm. long, the reflexed portion above the insertion of the stamens linear, about 8 mm. long. Filaments 4 to 5 mm. long; anthers about 2 mm. long.

MINDANAO, Lake Lanao, Camp Keithley (*Mrs. Clemens*) March, 1906, altitude about 800 m.

Loranthus copelandi Merrill sp. nov. *Dendropthoë* § *Eudendropthoë.*

Glabrous except the inflorescence, with 11 to 18 cm. long lanceolate to oblong-lanceolate petioled leaves, and many flowered axillary fascicled racemes, the flowers red and yellow, about 4.5 cm. long. Branches brownish gray, glabrous, terete. Leaves subcoriaceous, glabrous, minutely wrinkled-rugose when dry, dull, 11 to 18 cm. long, 2.5 to 3.5 cm. wide, narrowed above to the blunt apex and below to the somewhat attenuate base, the midrib very stout, the lateral nerves 3 to 4 on each side of the midrib, long, ascending, the reticulations obscure; petioles stout, about 1 cm. long. Inflorescence slightly ferruginous pubescent, 3 to 5 racemes fascicled in each axil or in the axils of fallen leaves, 4 to 7 cm. long. Flowers slender, the buds slightly pubescent, becoming glabrous except the calyx, red below, yellow above, about 20 in each raceme. Pedicels about 1 mm. long, puberulent, the bract narrowly ovate, acute, 1.5 mm. long, puberulent. Calyx cylindrical, rather densely ferruginous puberulent, 3 mm. long, with 5 small teeth. Corolla slender, somewhat curved, slightly enlarged above, 4 to 4.5 cm. long, 5-lobed, the lobes linear, about 1 cm. long, becoming recurved. Anthers not narrowed below, 3 mm. long, apiculate-acuminate; filaments about 5 mm. long.

LUZON, Province of Benguet, Daklan to Kabayan (4407 *Merrill*) October 27, 1905. Parasitic on *Pittosporum pentandrum* (Blanco) Merr., in thickets at about 1,500 m. A species apparently closely related to *Loranthus curvatus* Blume, differing in its vegetative characters and fascicled racemes.

Loranthus mindanaensis Merrill sp. nov. § *Dendropthoë.*

Shrubby, glabrous throughout. Branches terete, glabrous, light gray, the younger branchlets brownish to olivaceous, rather slender. Leaves coriaceous, glabrous, dull, ovate to oblong-ovate, 8 to 12 cm. long, 4 to 6 cm. wide, the base broad, usually rounded, the apex blunt-acute, the midrib stout; lateral nerves irregular, 3 to 4 on each side of the midrib, ascending, not prominent, the reticulations lax; petioles stout, about 3 mm. long. Inflorescence axillary, of solitary 3 to 5 cm. long racemose panicles, the flowers in groups of threes at the ends of the very short branchlets, the branchlets racemosely disposed, opposite, 2 to 3 mm. long. Flowers sessile, glabrous, the bracts broadly ovate, about 1.5 mm. long, obtuse. Calyx cylindrical, about 3.5 mm. long, the limb truncate, entire, slightly exceeding the ovary. Corolla red, tubular, not enlarged below, nearly 2 cm. long, the lobes 6, linear, united for the lower 2 mm. Filaments very short, less than 1 mm. long, inappendiculate, the anthers linear, about 3 mm. long, the portion of the petals above the insertion of the stamen about 5 mm. long, reflexed in anthesis.

MINDANAO, District of Davao, Davao (341 *Copeland*) March, 1904, on *Theobroma cacao* L., and *Antidesma ghesæmbilla* Gaertn.; Mount Apo (285 *DeVore & Hoover*) May, 1903. A species related to *Loranthus secundiflorus* Merr., and *L. subalternifolius* Merr., differing in vegetative characters from both.

Loranthus mirabilis Van Huerck et Muell. Arg. in Act. Soc. Helv. Sci. Nat. **55** (1872) 47. *Stemmatophyllum cumingii* Van Tiegh. Bull. Soc. Bot. Fr. **41** (1894) 505. *Loranthus cumingianus* Engl. Nat. Pflanzenfam. Nachträge (1897) 128, non *L. cumingii* Engl. l. c.

PHILIPPINES, without locality (1966 *Cuming*) 1836-1840, in Herb. Bureau of Science. BASILAN (3447 *Hutchinson*) December, 1905, parasitic on trees along the seashore. MINDANAO, Davao (376 *Copeland*) March, 1904; Lake Lanao, Camp Keithley (*Mrs. Clemens*) March, 1906.

The oldest name for this species is *Loranthus mirabilis* Van Huerck et Muell. Arg., the description being published in 1872 as above cited. The name is recorded in the first supplement to Index Kewensis, but the citation to the original publication is not given, the reference being to Van Tieghem, Bull. Soc. Bot. Fr. **41** (1894) 547, in obs. Van Tieghem l. c. states that he found this number of Cuming's Philippine collection in the herbaria of Van Huerck, DeCandolle, and Boissier under the name *L. mirabilis*. He did not, however, find a reference to the place of publication. Both *Loranthus mirabilis* and *Stemmatophyllum cumingii* (=*Loranthus cumingianus*) were based on the same number of Cuming's Philippine collection cited above. It was by chance only that I found a reference to the original publication of *Loranthus mirabilis*, in reading over the list of Mueller's publications given by Briquet,[11] and I am indebted to Dr. William Trelease, director of the Missouri Botanical Garden, for a copy of the rather long description and discussion of the species, the original publication not being available in Manila.

Loranthus secundiflorus Merrill sp. nov. § *Dendropthoë.*

Shrubby, less than 1 m. high, glabrous throughout except the minutely puberulent inflorescence. Branches slender, terete, smooth, somewhat enlarged and compressed below the nodes, olive brown when dry. Leaves opposite, lanceolate, coriaceous, shining, sessile, 8 to 10 cm. long, 2 to 3 cm. wide, paler beneath, the base obtuse or subacute, gradually narrowed above to the slightly acuminate apex; lateral nerves obscure, irregular, 5 to 7 on each side of the midrib, the reticulations lax. Inflorescence solitary, axillary, of 4 to 8 cm. long racemose panicles, the flowers secund, the axis and branchlets minutely puberulent, the branches of the inflorescence opposite, very short, about 3 mm. long, racemosely disposed, each with 2 or 3 sessile flowers at the apex, the bracts orbicular-ovate, obtuse, about 2 mm. long. Calyx cylindrical, 4.5 mm. long, minutely puberulent or subglabrous, the limb extending beyond the ovary and rather prominently 6-toothed. Corolla glabrous, cylindrical, not enlarged, about 2 cm. long, red, the lobes 2 mm. wide below, united for the lower 2 mm., the portion above the insertion of the stamens reflexed in anthesis, 5 to 6 mm. long. Anthers sessile, linear, inappendiculate, about 4.5 mm. long.

MINDANAO, Province of Surigao (237 *Bolster*) February 10, 1906. Parasitic on various trees in open lands at an altitude of about 15 m. above the sea. A species recognizable by its secund flowers and sessile anthers.

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[11] *Bull. Herb. Boiss.* (1896), 4, 128.

Loranthus sessiliflorus Merrill sp. nov. § *Phoenicanthemum.*

Shrubby, entirely glabrous, with axillary solitary or fascicled spikes of small sessile flowers, the whole inflorescence glabrous, red. Branches dark reddish brown or nearly black when dry, terete. Leaves opposite, very coriaceous, broadly-ovate to suborbicular-ovate, dull and minutely wrinkled on both surfaces when dry, the apex broad, rounded or obtuse, rarely somewhat narrowed and acute, the base acute to subtruncate, 8 to 11 cm. long, 5 to 8 cm. wide, the nerves 4 to 5 on each side of the stout midrib, obscure; petioles stout, about 1 cm. long. Spikes 1 to 4 or 5 in each axil, usually 3, 4 to 7 cm. long, many flowered. Flowers red, sessile, about 7 mm. long, the subtending bract very thick, orbicular, nearly 1.5 mm. in diameter. Calyx glabrous, cylindrical, about 2 mm. long, the limb very slightly produced beyond the ovary, truncate. Petals 4, free to the base, linear, scarcely widened below, 5 mm. long, the upper half curved-reflexed from the insertion of the stamens. Filaments about 1 mm. long, slightly rugose-wrinkled near the insertion below, the anthers continuous, slightly wider than the filaments, oblong, 1.5 mm. long. Style glabrous, about 5 mm. long. Immature fruit small, ovoid.

LUZON, Province of Bataan, Mount Mariveles (1171 *Whitford*) March, 1905; Province of Benguet, Baguio (6057 *Elmer*) March, 1904. MINDORO, Baco River (4041 *Merrill*) March, 1905; (125 *McGregor*) March, 1905. Parasitic on various trees, sea level to an altitude of about 1,500 m.

Loranthus subalternifolius Merrill nom. nov. *Amylotheca cumingii* Van Tiegh. Bull. Bot. Soc. France, 41 (1894) 264. *Loranthus cumingii* Engl. Nat. Pflanzenfam. Nachtr. (1897) 128, non *L. cumingianus* Engl. l. c.

Glabrous throughout. Branches light gray, terete, the branchlets often olivaceous, somewhat thickened and compressed below the nodes, smooth. Leaves coriaceous, subalternate, or the upper ones opposite, oblong-ovate, usually pale when dry, somewhat shining 8 to 13 cm. long, 4 to 5.5 cm. wide, usually gradually narrowed above to the acute, rarely slightly acuminate apex, and more abruptly narrowed below to the acute, often decurrent base; nerves about 6 on each side of the midrib, obscure; petioles 1 to 1.5 cm. long. Inflorescence of solitary, axillary, racemose panicles 4 to 7 cm. long, the branches short, opposite, spreading, racemosely disposed, about 3 mm. long, each bearing three sessile flowers at the apex, the bracts reniform, rounded, about 2 mm. long. Calyx cylindrical, about 5.5 mm. long, the limb strongly produced beyond the ovary, truncate, somewhat spreading. Corolla tubular, about 18 mm. long, golden yellow, somewhat inflated below, the lobes 6, linear, united for the lower 3 mm. Filaments very stout, about 2 mm. long; anthers linear, 2.5 mm. long, the portion of the petals above the insertion of the stamens thickened, nearly 6 mm. long, spreading or reflexed in anthesis.

PHILIPPINES (1969 *Cuming*) 1836–1840. LUZON, Province of Benguet, Sablan (6191 *Elmer*) April, 1904.

The above description is based on No. 6191 *Elmer*, my specimen of Cuming's plant a cotype of *Amylotheca cumingii* Van Tiegh.=*Loranthus cumingii* Engl., being fragmentary, but sufficient I believe to show the identity of the two specimens. Van Tieghem's description being very short and imperfect, it has been thought well to publish a longer one here.

Loranthus viridis Merrill sp. nov. § *Dendropthoë.*

Coarse, more or less branched, shrubby, glabrous throughout. Leaves opposite, coriaceous, usually pale or yellowish when dry, elliptical-ovate, ovate or even obovate, 6 to 11 cm. long, 4 to 6 cm. wide, rounded or acute at the apex, narrowed below to the acute, slightly decurrent base, shining above, dull beneath, the midrib stout, the lateral nerves obscure; petioles stout, 2 to 3 cm. long. Cymes 5 cm. long or less, few flowered, glabrous, solitary in the upper axils and terminal, the branches few, three or four, whorled at the summit of the 1 to 2.5 cm. long peduncles the branches spreading, about 1 cm. long, each branchlet with two or three flowers the pedicels about 2 mm. long, the bract subtending the flower small, orbicular-ovate, rounded. Flowers pale green, about 3.5 cm. long, the buds somewhat clavate at the tips. Calyx cylindrical, glabrous, 5 to 6 mm. long, the limb truncate, or very obscurely 6 toothed, slightly exceeding the ovary. Corolla slightly swollen below, the lobes 6, united for the lower 0.5 cm., 3 mm. wide below, gradually narrowed upward and 1 mm. wide above, the upper 1 cm. reflexed from the insertion of the stamens, much thickened and deeply channeled on the inner surface. Stamens 8 mm. long, the antheriferous portion narrow, about 3.5 mm. long, inappendiculate. Fruit fleshy, glabrous, ellipsoidal, about 12 mm. long.

LUZON, Province of Bataan, Mount Mariveles (816, 1814, 2938 *Borden*) June, September, 1904, and March, 1905. No. 1953 *Cuming,* Philippines, without locality, of which a fragmentary specimen exists in our herbarium, appears to belong here.

PHRYGILANTHUS Eichl.

Phrygilanthus obtusifolius Merrill sp. nov.

Glabrous throughout. Shrubby, much branched, about 1 m. long, the branches slender, brown or yellowish when dry, rigid, terete, the younger branches often somewhat compressed below the nodes, the nodes prominent. Leaves opposite, oblong-obovate, 3 to 6 cm. long, 1 to 2.5 cm. wide, the apex broad, rounded, gradually narrowed below to the cuneate base, coriaceous, dull, finely wrinkled on both surfaces when dry, the nerves, including the midrib, obsolete or nearly so; petioles 3 to 5 mm. long. Cymes glabrous, axillary and terminal, few, usually 2-flowered, solitary or two or three from each node, the peduncles slender, 1 to 2 cm. long, the pedicels 3 mm. long. Flowers white about 1 cm. long the bract small, rounded, about 1 mm. long. Calyx glabrous, cylindrical, truncate, 3 mm. long, the limb slightly exceeding the ovary. Petals 5, free, slightly enlarged, and 2 mm. wide below, narrowed above, the upper three-fifths curved-reflexed from the insertion of the stamens. Filaments 6 mm. long; anthers oblong, obtuse, versatile. Style glabrous, about 12 mm.

long, slender. Fruit yellowish or bright red, glabrous, fleshy, ovoid, 6 to 7 mm. long.

LUZON, Province of Bataan, Lamao River, Mount Mariveles (1081, 134 *Whitford*) February, 1905, May, 1904; (1813 *Borden*) September, 1904. Parasitic on *Eugenia* and other trees in forests at about 600 m. about the sea.

The first species of the genus to be found in the Philippines, the other known species being mostly confined to tropical America and Australia. In gross characters and habit strongly resembling *Loranthus nodosus* (Van Tiegh.) Engl. *Loranthus* sp. Merr. Phil. Journ. Sci. Suppl. 1 (1906) 50.

OLACACEÆ.

XIMENIA Linn.

Ximenia americana Linn. Sp. Pl. (1753) 1193; Miq. Fl. Ind. Bat. **1** (1855) 786; Masters in Hook. f. Fl. Brit. Ind. **1** (1875) 574; F.-Vill. Nov. App. (1883) 45.

BASILAN (3467 *Hutchinson*) December, 1905. Along the seashore, common, Moro, *Pangungan*. PALAWAN, Malinao River (3799 *Curran*) February, 1906.

This widely distributed species has previously been reported from the Philippines only by Fernandez-Villar, who states that he saw living specimens in many localities in the Province of Iloilo, Panay. So far as is known, the specimens cited above are the only Philippine ones extant. Tropical shores of America, Africa, Asia, and Malaya.

BERBERIDACEÆ.

MAHONIA Linn.

Mahonia nepalensis DC. Syst. **22** (1821) 21; Prodr. **1** (1824) 109; Fedde in Engl. Bot. Jahrb. **31** (1901) 120. *Berberis nepalensis* Spreng. Syst. Veg. **2** (1825) 120; Hook. f. Fl. Brit. Ind. **1** (1872) 109; Forbes & Hemsl. Journ. Linn. Soc. Bot. **23** (1886) 31.

LUZON, Province of Benguet, Baguio (5929 *Elmer*) March, 1904; (18 *Topping*) February, 1903. An interesting addition to our knowledge of the Asiatic element in the Philippine flora, the species having previously been known from the mountains of British India, Java, China, and Japan. No. 5929 *Elmer* has been examined by *Schneider*, who has recently monographed the genus *Berberis*,[12] and who verifies the above identification, although stating that in the absence of flowers the determination can not be absolutely certain. Topping's specimen is with flowers, and offers no characters by which I am able to distinguish the Philippine form from the above species.

ANONACEÆ.

UNONA Linn.

Unona merrittii Merrill sp. nov. § *Stenopetalon*.

A tree 20 to 25 m. high, glabrous throughout except the slightly puberulent flowers, the flowers greenish yellow, very fragrant, in fascicles from small tubercles on the branches below the leaves. Branches gray or grayish brown, quite glabrous throughout, striate when dry. Leaves oblong-lanceolate to elliptical-lanceolate, glabrous, subcoriaceous, shining above, pale and somewhat glaucous beneath, 10 to 14 cm. long, 2 to 3 cm. wide, the base acute, slightly inequilateral, the apex acute or obscurely sharp acuminate; nerves about 15 on each side of the midrib, indistinct, scarcely more prominent than the secondary nerves and lax reticulations; petioles glabrous, 5 mm. long. Flowers in fascicles of 4 to 10 or more on the branches below the leaves, the pedicels slender, glabrous, 1.5 to 2.5 cm. long. Calyx pubescent, the lobes orbicular-reniform, rounded, about 1.2 mm. long, wider than long. Petals 6, 2-seriate, equal, narrowly oblong blunt, not or but slightly narrowed above, puberulent, 1.6 to 2 cm. long, 4 mm. wide. Stamens about 1 mm. long, nearly as wide, the connective very shortly produced, truncate, concealing the cells. Ovaries many, glabrous, oblong, 1 mm. long, the ovules 2, on the ventral suture; stigma elliptical-ovoid, equaling the ovary in size. Fruit unknown.

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[12] *Bull. Herb. Boiss* (1905) II; **5**.

MINDORO, Bongabong River (1447 *Whitford*) February 23, 1906 (type); (3712 *M. L. Merritt*) March 20, 1906. Delta of the river slightly above sea level, in forests. A species apparently related to *Unona desmantha* Hook. f. et Th., but quite distinct from that species. The flowers have the same color and odor as *Canangium odoratum* Baill.

MYRISTICACEÆ.

MYRISTICA Linn.

Myristica nivea Merrill sp. nov.

A tree about 12 m. high, glabrous. Branches terete, striate, glabrous except the innovations. Leaves chartaceous, oblong, the base rounded, the apex acute, glabrous above and somewhat shining, beneath glabrous, white, the midvein thick; nerves 14 to 15 on each side of the midrib, prominent, curved, brown, anastomosing near the margin, the secondary and tertiary nerves indistinct, the reticulations lax; petioles glabrous, sulcate, rugose when dry, 1 to 3 cm. long. Staminate inflorescence axillary, few flowered, the peduncle very short, the pedicels 3 mm. long, ferruginous pubescent, shorter than the flowers. Flowers subovoid, 7 to 9 mm. long, fasciculate, outside rufous-pubescent, inside glabrous, three parted for the upper one-fourth or one-fifth, the basal bract broadly ovate, obtuse, pubescent outside. Anthers about 10, 3 to 4 mm. long, narrowly linear, connate, glabrous, the stipe shorter than the column. Fruit solitary, short and thickly pediceled, broadly ovoid, subtruncate or rounded at the base, rounded at the apex, densely rufous pubescent or puberulent, 3 cm. long, the pericarp thick, the aril laciniate nearly to the base, the areolae narrow.

BASILAN (3454 *Hutchinson*) December, 1905 (Staminate flowers). MINDANAO, District of Zamboanga, San Ramon (*Copeland*) March, 1905 (fruit).

A species apparently most closely related to *Myristica mindanaensis* Warb., of the known Philippine species of this genus, differing from it in its fewer nerved leaves, fasciculate, much larger flowers, and other characters. *Myristica nivea* is well characterized by the very white under surface of its leaves and very obscure, almost obsolete, lax, not parallel reticulations. It is known to the natives of Basilan as *Nyatnyat*.

LAURACEÆ.

ACTINODAPHNE Nees.

Actinodaphne philippinensis Merrill sp. nov.

A tree 15 to 20 m. high, quite glabrous except the inflorescence, with penninerved oblong-ovate to elliptical-ovate, alternate, subcoriaceous leaves which are somewhat glaucous beneath, and short, axillary, racemose inflorescence, the clusters of flowers pediceled. Branches brown, glabrous, the younger ones nearly black when dry. Leaves 8 to 15 cm. long, 4 to 8 cm. wide, shining above, the base rounded or acute, rarely slightly inequilateral, the apex acute or obscurely acuminate; nerves about 10 on each side of the midrib, prominent beneath, scarcely anastomosing, the ultimate reticulations dense; petioles 2.5 to 4 cm. long. Racemes axillary or from the axils of fallen leaves, rather densely ferruginous puberulent, the axis 1 cm. long or less, the peduncles 1 cm. long or less, puberulent, the bracts 6, orbicular ovate, concave, rounded, 6 to 7 mm. long, veined, glabrous or slightly pubescent. Flowers about 7 in each cluster, yellow, the perianth segments 6, sometimes 5, lanceolate, acute or acuminate, about 4 mm. long, 1.5 mm. wide, somewhat pilose, the tube about 1 mm. long. Stamens 9, all fertile, the anthers 4-locellate, all introrse; filaments about 4 mm. long, pilose below, the inner three glandular at the base. Pistillate flowers and fruits not seen.

MINDORO, Bongabong River (1476, 1416 *Whitford;* 3667 *Merritt*) February, March, 1906, the former with mature flowers, the latter two with buds only. In forests, delta of the Bongabong River, slightly above sea level, the first species of the genus to be reported from the Philippines. T., *Bakan*.

CRYPTOCARYA R. Br.

Cryptocarya acuminata Merrill sp. nov.

A tree 8 to 12 m. high with alternate ovate-lanceolate to oblong-lanceolate, rather slenderly sharply acuminate penninerved leaves which are paler and glaucous beneath, and axillary and terminal panicles which are densely ferruginous pubescent with short shining hairs. Branches light brown, rather densely ferruginous puberulent. Leaves subcoriaceous, shining and glabrous above, beneath glabrous or minutely puberulent on the midrib and nerves when young, the base rounded or acute, gradually narrowed above to the slender acuminate apex; nerves 8 to 10 on each side of the midrib, prominent beneath, ascending, parallel, scarcely anastomosing, the reticulations indistinct; petioles ferruginous puberulent, 1 to 1.5 cm. long. Panicles 5 to 7 cm. long, the peduncles 3 to 4 cm. long. Perianth segments 6, elliptical ovate to oblong ovate, acute or obtuse, subequal, densely ferruginous puberulent outside, about 2 mm. long, about equaling the tube. Fertile stamens 9, the filaments short, somewhat pubescent, the anthers 2-locellate, those of the first and second series introrse, those of the third series extrorse, the fourth series of large stipitate, cordate, acuminate, staminodes. Ovary narrowly ovoid, glabrous, narrowed above into the style. Fruit black when dry, glabrous, or slightly puberulent, shining, subglobose, about 7 mm. in diameter.

MINDORO, Bongabong River (3673 *Merritt;* 1425 *Whitford*) March, February, 1906. In forests near the river slightly above sea level.

DEHAASIA Blume.

Dehaasia triandra Merrill sp. nov.

A tree 10 to 15 m. high, glabrous, only the three inner stamens fertile, the outer series reduced to staminodes. Branches light gray, glabrous. Leaves ovate-lanceolate to oblong-ovate, glabrous, subcoriaceous, somewhat shining on both surfaces, 10 to 20 cm. long, 4 to 7 cm. wide, narrowed below to the acute base and above to the sharply acuminate apex; nerves 7 to 9 on each side of the midrib, curved ascending, rather distinct beneath, the reticulations rather obscure, lax; petioles 1.5 to 2 cm. long, nearly black when dry. Panicles several from the young portions of each branchlet, glabrous, black when dry, 4 to 10 cm. long, few flowered, the peduncles 5 cm. long or less, the branches usually spreading, the flowers usually in threes at the tips of the branchlets. Flowers small, hermaphrodite. Calyx segments 6, deciduous, broadly ovate, acute, the inner three about 1.5 mm. long, the outer three somewhat smaller, slightly ciliate on the margins. Fertile stamens 3 only, in the inner row, the filaments pubescent, glandular at the base, the anthers 2-celled, extrorse, the stamens of the router series reduced to flattened pubescent staminodes. Ovary narrowly ovoid, glabrous, about 1 mm. long, narrowed above into the 1 mm. long style. Fruit elliptical to elliptical oblong, glabrous, 3 to 3.5 cm. long, 1.5 to 2 cm. thick, the pedicel when fresh 5 cm. long or less, at least as thick as the mature fruit, fleshy, bright red, when dry 2 to 5 cm. long, less than 1 cm. thick, black.

MINDORO, Bongabong River (3751 *Merritt;* 1459 *Whitford*) March, February, 1906. MASBATE (3068 *Merrill*) August, 1903. LUZON, Province of Rizal (2000 *Ahern's collector*) November, 1904.

An anomalous species, differing from *Dehaasia* as described in its 3, not 9, fertile stamens, but so evident are the fruit characters that I have not hesitated to refer it to the above genus. In connection with this species I have carefully studied the description of *Salgada laurifolia* Blanco, referred by F.-Villar to *Eusideroxylon borneense.* The above specimens do not at all agree with Blanco's description, and to me it appears very doubtful if *Salgada* can be referred to *Eusideroxylon* with safety.

CRUCIFEREÆ.

LEPIDIUM Linn.

Lepidium ruderale Linn. Sp. Pl. (1753) 645; Hook. f. & Andr. in Hook. f. Fl. Brit. Ind. 1 (1872) 160.

LUZON, Province of Cagayan, Tuguegarao (188 *Merrill*) June 8, 1902. In dry, open, waste places, a weed, apparently introduced, but well established. Not previously reported from the Philippines. Europe, Asia, North America, and Australia.

CARDAMINE Linn.

Cardamine parviflora Linn. Sp. Pl. ed. 2 (1763) 914; DC. Prodr. **1** (1824) 152; Forbes & Hemsl. Journ. Linn. Soc. Bot. **23** (1886) 44.

LUZON, District of Lepanto, Balili (4609 *Merrill*) November 5, 1905, in a coffee plantation, damp shaded soil at about 1,600 m.; Province of Benguet, Baguio (5846 *Elmer*) March, 1904, in open damp soil along streams at about 1,400 m.

The first species of the genus to be reported from the Philippines, apparently native, and not distinguishable from the widely distributed *Cardamine parviflora* Linn., which extends from North America to Europe, northern Africa, and temperate Asia southward to Formosa.

ROSACEÆ.

RUBUS Linn.

Rubus copelandi Merrill sp. nov.

An ascending plant 1 to 1.8 m. high, with trifoliate leaves and solitary axillary white flowers, or sometimes two or more pedicels from the upper axils, the stems, petioles, and pedicels with usually slender, recurved spines, and slender spine-like capitellate hairs. Stems terete, greenish or reddish, not at all pubescent, the spines and intermixed capitellate hairs rather numerous. Leaves alternate, trifoliate, the petioles about 3 cm. long, spiny and with capitellate stiff hairs, the stipules ovate-lanceolate to oblong ovate, acuminate, nearly 1 cm. long, foliaceous, capitellate hairy; leaflets ovate to elliptical-ovate, acuminate, firm, brittle when dry, glabrous on both surfaces, except the somewhat pubescent midrib above, paler beneath, 4 to 7 cm. long, 2 to 4 cm. wide, rather abruptly acuminate, the base broad, rounded, that of the lateral leaflets often inequilateral, the margins dentate or bidentate, the teeth small, mucronate acuminate; nerves about 10 on each side of the midrib, rather prominent, parallel, the midrib and often the lateral nerves with retrorse spines beneath, petiolules of the terminal leaflets about 1.5 cm. long, of the lateral ones 1 to 2 mm. Flowers white, 2.5 to 3 cm. in diameter, the pedicels 1 cm. long or less, spiny and with capitellate hairs. Calyx cinereous pubescent or puberulent, the lobes with few slender spines and capitellate hairs, ovate lanceolate, acuminate, often 1 cm. long, 5 mm. wide or less. Petals elliptical, rounded, somewhat narrowed below, about 12 mm. long, 8 mm. wide, distinctly veined. Stamens indefinite;

filaments 4 to 5 mm. long, glabrous; anthers 1 mm. Ovaries many, glabrous. Receptacle glabrous. Fruit red, ovoid about 1.5 cm. long, glabrous.

LUZON, Province of Benguet, Pauai (4810 *Merrill*) November 8, 1905. In thickets near border of the mossy forest at about 2,200 m. A species characterized by its trifoliate leaves, solitary large flowers, and peculiar capitellate, almost spine-like, hairs.

Rubus luzoniensis Merrill sp. nov.

A scandent shrub 5 to 6 m. high, with simple leaves, and terminal lax panicles, the branches, inflorescence, and under surface of the leaves densely pale ferruginous pubescent. Branches brown, terete, stiff, with scattered, small, usually somewhat retrorse spines, densely ferruginous pubescent. Leaves coriaceous, ovate to elliptical-ovate, 5 to 10 cm. long, 4 to 7 cm. wide, the base broad, truncate to slightly cordate, the apex acute or blunt, the margins rather finely dentate, not lobed, the upper surface dull or slightly shining, somewhat pilose on the midrib and nerves and also with few scattered long hairs on the lamina, becoming nearly glabrous, the under surface pale and very densely pubescent, the midrib and nerves also with scattered long hairs, the midrib with few scattered spines; nerves 6 to 7 on each side of the midrib, prominent, ascending, nearly straight, the reticulations prominent, subparallel; petioles 1 to 2.5 cm. long, densely pubescent and with small scattered spines. Inflorescence a terminal, rather lax panicle often 30 cm. long, the rhachis, branches and branchlets very densely ferruginous pubescent or pilose, and with scattered small spines, the branches irregular, distant, usually spreading, the lower ones often 15 cm. long, few flowered. Flowers white, short pediceled, about 1.6 cm. in diameter, the bracts ovate lanceolate, densely pubescent, 5 mm. long or less. Calyx very densely ferruginous pilose, the lobes ovate to oblong-ovate, acute, about 6 mm. long. Petals oblong obovate, gradually narrowed below, obtuse, 6 to 7 mm. long, 3 to 4 mm. wide. Stamens indefinite; filaments glabrous, about 5 mm. long; anthers 0.5 mm. long. Ovaries many, somewhat pilose on one side above or nearly glabrous, the receptacle pilose. Fruit unknown.

LUZON, District of Lepanto, Mount Data (4596 *Merrill*) November 4, 1905. In the mossy forest at about 2,250 m. Sterile specimens of another species were collected in the same locality, strongly resembling the above, but the leaves quite glabrous or at least only slightly pilose beneath.

LEGUMINOSEÆ.

INDIGOFERA Linn.

Indigofera linifolia Retz. Obs. 4 (1779–1791) 29; Baker in Hook. f. Fl. Brit. Ind. 2 (1876) 92.

LUZON, Province of Benguet, Ambuklao to Daklan (4387 *Merrill*) October 25, 1905. On dry, rocky banks in open grass lands at an altitude of about 900 m. Not previously reported from the Philippines. Abyssinia to Afghanistan, British India, Malaya, and northern Australia.

MUCUNA Adans.

Mucuna acuminata Merrill sp. nov. § *Carpopogon.*

A long slender climber reaching a height of from 12 to 15 m. with slender glabrous branches, glabrous trifoliate leaves and short or long peduncled pendulous inflorescence, the flowers pale green or nearly white, 5 to 5.5 cm. long, the pods about 20 cm. long, rather strongly abruptly acuminate, without transverse plates and nearly glabrous, broadly winged down both sutures. Petioles 8 to 10 cm. long, glabrous or very slightly pubescent, the petiolules about 5 mm. long; leaflets ovate to elliptical ovate, 10 to 18 cm. long, 6 to 11 cm. wide, abruptly caudate-acuminate, the base rounded or subcordate, the terminal one regular, the lateral ones inequilateral glabrous, or when young with few appressed hairs; stipels subulate, nearly 5 mm. long. Peduncles slender, 20 to 60 cm. or more in length, the flowers paniculate at the apex, the branches 5 cm. long or less, the pedicels 1 to 1.5 cm. long, pubescent; bracts and bracteoles early deciduous. Calyx cup-shaped, 1 cm. long, about as broad, densely ferruginous and cinerous pubescent, but without stinging hairs, suboblique, the teeth short, broad. Keel and wings subequal, the former somewhat inflexed at the apex, the wings clawed, auricled at the base, pubescent on the margins below; standard about 2.5 cm. long, wider than long, retuse. Pod oblong, 18 to 21 cm. long, 5 to 5.5 cm. wide, 4 to 6 seeded, black when dry, shining, reticulate, but without plaits and stinging hairs, often somewhat pubescent below, the base acuminate, the apex abruptly apiculate-acuminate, the acumen 1.5 to 2 cm. long, the marginal wings about 1 cm. wide.

MINDORO, Baco River (4069 *Merrill*) March, 1905 (type); (220, 322 *McGregor*) April–May, 1905. In thickets along the river. Possibly No. 2955 *Ahern's collector*, from Bosoboso, Province of Rizal, Luzon, is the same, but the specimens are with immature flowers only.

A species closely related to *Mucuna gigantea* DC., differing from that species in its larger pods, which are without stinging hairs and which are rather long apiculate-acuminate, rather larger flowers and leaves, the leaflets also differing in shape and size. Differing from *M. longipedunculata* Merr., in its much smaller flowers.

Mucuna luzoniensis Merrill sp. nov. § *Stizolobium.*

Scandent, the trifoliate leaves 20 cm. long or less, the short peduncled racemes 15 to 40 cm. long, densely flowered, the flowers black-purple, about 3.5 cm. long, the pods flattened, scarcely turgid, not plaited or winged, straight, 9 cm. long, 1.5 cm. wide, densely covered with reddish-brown pungent stinging hairs. Petioles 8 to 10 cm. long, pubescent, the petiolules very densely pubescent, about 5 mm. long; terminal leaflet broadly ovate, rounded-truncate at the base, the apex rounded, apiculate, the lateral leaflets somewhat larger, 8 to 9 cm. long, 6 to 8 cm. wide, irregularly broadly truncate at the base, the apex rounded, apiculate, beneath very densely grayish pubescent, above pubescent, especially on the nerves; nerves rather prominent, 6 to 7 pairs. Racemes densely cinereous pubescent and with brownish stinging hairs. Pedicels about 5 mm. long. Calyx about 1 cm. long, the teeth acute or acuminate, cinereous pubescent and with numeruos long, brownish red, stinging hairs. Corolla black-purple, about 3.5 cm. long; standard about 2 cm. long; wings slightly shorter than the keel, the latter somewhat inflexed at the apex. Pod flat, straight, abruptly hooked at the apex, with about 5 seeds.

LUZON, Province of Union, Bauang (5999 *Elmer*) February, 1904, distributed as *Mucuna sericophylla* Perk., from which it differs in its apiculate, not retuse leaflets, somewhat smaller flowers, and much broader pods.

Mucuna lyonii Merrill sp. nov. § *Stizolobium*. *Negretia mitis* Blanco (non Beauv.) Fl. Filip. ed. 1 (1837) 588; ed. 2 (1845) 410; ed. 3, **2** (1878) 388; Naves l. c. *t. 405* bis. *Mucuna nivea* F.-Vill. (non DC.) Nov. App. (1883) 63.

A scandent annual vine with somewhat pubescent, with apiculate leaflets, axillary racemes 30 to 40 cm. long, of very pale green, nearly white flowers 4 to 4.5 cm. long and narrowly oblong pods 10 to 12 cm. long, 2 cm. wide, densely covered with brown or gray hairs, not plaited or winged. Stems striate, pubescent with appressed grayish hairs. Leaves 25 to 40 cm. long, the leaflets three, membranous, the terminal one broadly ovate, regular, the apex acute or obtuse, the base subtruncate-acute, 11 to 14 cm. long, 9 to 11 cm. wide, the lateral leaflets 20 cm. long and 12 cm. wide, or less, oblique-truncate at the base, much broader on one side of the midrib than on the other, the apex apiculate, glabrous and shining above, beneath paler and with scattered appressed rather long grayish hairs; petioles 30 cm. long or less, somewhat pubescent; petiolules nearly 1 cm. long, rather densely pubescent; stipels subulate, about 2 mm. long. Racemes 30 to 40 cm. long, many flowered, more or less appressed grayish pubescent. Flowers in groups of threes, the internodes 1.5 to 2 cm. long, the pedicels about 8 mm. long. Calyx pale green, rather densely appressed grayish pubescent, the upper tooth triangular-ovate, acute, 7 to 8 mm. long, the lower lanceolate, acuminate, 1 cm. long, the two lateral ones lanceolate, acute or acuminate, 5 mm. long. Standard broadly elliptical-ovate, 2.5 cm. long, 2 cm. wide, obtuse, minutely retuse; wings 4 cm. long, 1.5 cm. wide, obtuse, auriculate at the base, claw short; keel equaling the wings, the upper 1 cm. inflexed, auricled at the base, the claw short. Ovary hirsute. Pods slightly turgid, somewhat curved, mucronate at the apex, slightly compressed between the seeds; seeds about 6.

Description from plants raised in Manila by *W. S. Lyon* of the Bureau of Agriculture, the seeds from Pampanga Province, LUZON, known to the Pampangans as *Sabual*. Blanco gives only the Spanish names *Habas* and *Garbanzos*.

PTEROCARPUS Linn.

Pterocarpus klemmei Merrill sp. nov.

A large tree with glabrous shining leaves, terminal panicles and yellow flowers, the pods densely dark brown velvety pubescent when young and with many short soft spine-like processes in the central portion. Branches lenticellate, glabrous. Leaves alternate, about 20 cm. long, the rhachis slightly and sparingly pubescent with very short hairs; leaflets alternate, about 10, thinly coriaceous or submembranous, ovate to oblong-ovate, acuminate, the base broad, rounded, 5 to 7 cm. long, 3 to 4 cm. wide, glabrous and shining on both surfaces; nerves about 8 on each side of the midrib, the reticulations close, distinct; petiolules 2 to 3 mm. long. Panicles about 20 cm. long. Flowers yellow, about 1.5 cm. long. Calyx about 9 mm. long, the lobes short, acute or acuminate, pubescent with few scattered short hairs. Pods (immature) oblong-ovate, about 3 cm. long, thin, the stipe short, the pedicel about 1 cm. long, the periphery of the pod from stipe to style nearly straight or slightly convex, the style subulate, both surfaces densely dark brown velvety pubescent, shining, the wings without spine-like processes, but the pod proper with numerous soft spine-like processes 2 mm. long or less.

LUZON, Province of Cagayan, Palanan (4275 *W. Klemme*) June, 1906.

A species in vegetative and floral characters resembling *Pterocarpus indicus* Willd., and *P. echinatus* Pers., differing from both in its densely velvety young pods, from the former in having soft, spine-like processes on the pods and from the latter in having fewer and shorter, soft, spine-like processes instead of numerous stiff spines. The fourth species of the genus to be found in the Philippines, possibly a fifth being represented by No. 1002 *Clark*, Masbate, this specimen having densely velvety young pods without spine-like processes.

SINDORA Miq.

Sindora supa Merrill sp. nov. *Sindora wallichii* var. *intermedia* F.-Vill. (non Bak.) Nov. App. (1880) 71. *Sindora wallichii* Vidal (non Benth.) Sinopsis, Atlas (1883) 24. *t. 43. f. C.;* Rev. Pl. Vasc. Filip. (1886) 118; Ceron Cat. Pl. Herb. (1892) 70; Ahern Import. Philip. Woods (1901) 80.

A tree reaching a height of 25 m. and a diameter of 140 cm. with equally pinnate leaves, coriaceous glabrous leaflets and densely pubescent calyx lobes which have a few straight or curved spines on the upper half. Branches and branchlets glabrous. Leaves with a glabrous rhachis 6 to 7 cm. long; stipules foliaceous, 1 cm. long, acute, the base rounded or auriculate, glabrous or nearly so; leaflets 2, or mostly 3-jugate, the lower pair somewhat smaller than those above, oblong-ovate, 5 to 8 cm. long, 2.5 to 4 cm. wide, very coriaceous, entirely glabrous or with few scattered hairs on the under surface, especially on the midrib, the apex rounded, the base acute; nerves numerous, close, faint; petiolules 4 mm. long, glabrous. Flowers in rather dense axillary and terminal panicles 10 to 15 cm. long, the rhachis densely pubescent; bracts 4 mm. long, acute, pubescent; pedicels 2 mm. long, each with two lanceolate acute pubescent bracteoles 4 mm. long. Calyx tube short, the lobes four, thick, 1 cm. long, densely pubescent within with appressed yellowish hairs, outside densely cinereous puberulous and in the upper half with few straight or curved pubescent spines about 3 mm. long. Petal 1, as long as the calyx lobes, densely appressed pubescent on the margins below. Staminal sheath and filaments hairy. Ovary hirsute. Pod broadly ovate, flattened, rounded at the base, the apical beak very small or nearly obsolete. Valves dehiscent, woody, uniformly armed on the outside with strong straight spines 5 mm. long or less and more or less densely ferruginous pubescent, becoming quite glabrous in age. Seeds usually four, ovate, hard, black, with an arillate funicle.

LUZON, Province of Tayabas, Pagbilao (2611 *Merrill*) May, 1903; Lagumanoc (2596 *Merrill*) March, 1903; (23 *Ware*) September, 1903; (910 *Whitford*) September, 1904; (201 *Merrill*) Decades Philip. Forest Flora, coll. *Hunt*, May, 1903; Atimonan (859 *Bath*) June, 1904; Guinayangan (860 *Bath*) June 1, 1904; (2021 *Merrill*) April, 1903; Baler (1010 *Merrill*) August, 1902.

A species related to, and previously identified with *Sindora wallichii* Benth. (*S. wallichiana* Benth.) of the Malayan Peninsula, differing from that species in its glabrous leaves, and larger pods. Dr. Prain, director of the Royal Gardens, Kew, has examined some of the material cited above and informs me that this species is not identical with Bentham's *S. wallichiana*. I have accordingly described the Philippine plant as a distinct species, using for the specific name the Tagalog name "Supa," by which this important timber tree is universally known in the Philippines.

The timber of this tree is hard and of a yellowish or reddish color, being used in naval and general constructions, and is frequently substituted for the more valuable "Ipil" wood (*Intsia bijuga* O. Ktze.). From 1900 to 1904 supa ranked fourteenth in amount received in the local lumber markets, with a total of 177,189 feet B. M., its average price for sawed lumber being $81.50, United States currency per 1,000 feet B. M.

In addition to being a valuable timber tree, supa also yields considerable quantities of straw-colored or light-yellow, somewhat fragrant oil which burns with a clear flame. This has been discussed by Clover[13] sub *Sindora wallichii*.

From a report submitted to the Chief of the Forestry Bureau by Mr. Kobbe, forester, the following extracts are taken:

"This oil (supa) is secured from the trunk of the living tree and not from the fruit or dead wood. The tree is usually hacked with bolo cuts as high as a man can reach and the oil runs down the channels so formed, into some vessel so placed as to catch the product. The oil seems to be a product of the entire woody portion of the tree and does not flow from any particular portion such as the sap wood only. If an auger hole be bored into the heart of a living tree, as much as 10 liters of oil is frequently obtained from the one hole. When the trees are slashed for gathering the oil, the first that exudes is set on fire, the heat causing a great increase in the flow of oil."

"The oil is not widely used. There is a demand for it for the manufacture of paint, especially for use on ships, varnish for sailboats, etc., and as an illuminating oil."

Tagalog, *Supa*, in Baler also *Manapo*.

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[13] *Phil. Journ. Science* (1906), 1, 192.

RUTACEÆ.

ATALANTIA Correa.

Atalantia linearis (Blanco). *Limonia linearis* Blanco, Fl. Filip. ed. 1 (1837) 357. *Limonia monophylla* Blanco, l. c. ed. 2 (1845) 252; ed. 3, **2** (1878) 103; Merrill, Govt. Lab. Publ. **27** (1905) 28, non Linn. *Atalantia monophylla* F.-Vill. Nov. App. (1880) 27, non Correa.

A shrub 1 to 3 m. high. Branches light gray, glabrous, the young branchlets greenish, pubescent or puberulent, terete. Leaves alternate, linear to narrowly linear-oblong or linear-lanceolate, glabrous, shining, coriaceous, 2 to 7 cm. long, 3 to 10 mm. wide, the base acute, the apex blunt, retuse, entire, the margins often somewhat recurved, the midrib prominent, the lateral nerves numerous, scarcely more distinct than the dense reticulations; petioles glabrous or pubescent, 3 mm. long or less. Inflorescence of terminal and axillary panicles, 3 to 5 cm. long, pubescent, the branches short, few flowered. Flowers white, short pediceled, about 6.5 mm. long. Calyx short, regularly 5-lobed, the lobes imbricate, broadly suborbicular, rounded, about 2 mm. long, 2.5 mm. wide, pubescent, the margins ciliate. Petals 5, free, oblong, the apex rounded, 6 to 6.5 mm. long, about 3 mm. wide, somewhat narrowed at the base. Stamens 5; filaments broad, 4 mm. long; anthers about 1.4 mm. long. Ovary glabrous, 3-celled, sessile, the disk shallow. Fruit glabrous, globose, white, glandular-punctate, about 8 mm. in diameter.

LUZON, Province of Rizal, Montalban (3392 *Ahern's collector*) November 28, 1905; (5044 *Merrill*) March 8, 1906, the former in flower, the latter with mature fruit. On cliffs and boulders at an altitude of about 40 m. along the river, frequently in situations submerged at high water associated especially with *Eugenia mimica* Merr., and sometimes with *Homonoya riparia* Lour. T., *Dayap na monti* (Blanco), *Aguhu* (Ahern's collector).

A species at once recognized by its very narrow leaves, which are retuse at the apex. Blanco's original description of this species is very short, his material being from the Island of Maricaban, Province of Batangas, Luzon, flowering in the month of July. In this description he states that the leaves are minutely serrate, probably from the fact that in specimens with recurved leaf margins, the slightly raised veins on the upper surface appear like minute teeth. The note following the description of the species in the first edition of the Flora de Filipinas is excluded in the second, this note referring to a similar form observed by Blanco in the Province of Bulacan, Luzon. I am of the opinion that the form here described is identical with Blanco's *Limonia linearis*, and accordingly his specific name is adopted and the species is redescribed under *Atalantia*.

Atalantia retusa Merrill sp. nov.

A shrub about 3 m. high, with oblong elliptical to elliptical-ovate, subcoriaceous, glabrous, strongly retuse leaves, racemose inflorescence and 5- to 7-merous flowers, the stamens 10 to 15, free, the ovary 1-celled. Branches brownish gray, glabrous, the branchlets green, glabrous. Leaves 5 to 9 cm. long, 2.5 to 4 cm. wide, shining, broad at both ends, scarcely narrowed above, the base rounded; nerves numerous, anastomosing;

petioles 8 mm. long or less, the spines short or wanting. Racemes in the upper axils, 1.5 cm. long in anthesis, densely flowered, puberulent. Calyx somewhat puberulent, the teeth 5 to 7, short, broad, regular, their margins ciliate, obtuse. Petals 5 to 7, glabrous, oblong, obtuse, 5 to 5.5 mm. long, 2.5 mm. wide. Stamens 10 to 15, unequal, the filaments free, 2.5 to 3.5 mm. long; anthers broadly ovate, slightly exceeding 1 mm. in length. Ovary oblong, glabrous, 1-celled, 1-ovuled; style much shorter than the ovary, including the stigma about 1 mm. long. Disk thickened, ring formed. Fruit (immature) ovoid, glabrous.

PALAWAN, Puerto Princesa (3609 *Curran*) January 30, 1906; (195 *Bermejos*) December, 1905. In old clearings and thickets, not common, at about 20 m. above sea level.

A species apparently related to *Atalantia disticha* (Blanco) Merr., differing from the latter in its leaves not being narrowed above, and in its flower characters. In some cases a very rudimentary second cell was observed in the ovary, showing that the species is perhaps sometimes with 2-celled ovaries. The very short style is another aberrent character, as well as the variable number of calyx teeth, petals, and stamens. In other species of the genus the ovary is from 2 to 5 celled, the petals and calyx teeth 3 to 5, and the style equaling or longer than the ovary.

SKIMMIA Thunb.

Skimmia japonica Thunb. Fl. Jap. (1784) 62; Skan in Curt. Bot. Mag. IV. **1** (1905) *t. 8038*.

LUZON, District of Lepanto, Mount Data (4552 *Merrill*) November, 1905.

This species is generally distributed, but not abundant, in the mossy forest above 2,200 m. on Mount Data, and along the high ridges between Loo and Pauai in Benguet Province, and will doubtless be found on most of the high mountains of northern Luzon. Vidal[14] has reported an undetermined species of *Skimmia* from Lepanto, which is probably identical with the specimens here determined as *S. japonica*, while in a manuscript list of identifications of Loher's Philippine plants, made at Kew, No. 237 *Loher* is determined as *S. japonica*. From the material at hand I am unable to distinguish the Philippine form from *Skimmia japonica*, so well figured and described in Curtis's Botanical Magazine. The specimens available have immature flowers and mature fruits, the inflorescence being racemose and the flowers 5-merous. The discovery of *Skimmia* in the Philippines is a very interesting addition to the northern element in the Philippine flora, the present species being previously known only from Japan and Formosa.

POLYGALACEÆ.

POLYGALA Linn.

Polygala glomerata Lour. Fl. Cochinch. (1790) 426; DC. Prodr. **1** (1824) 326; Benth. Fl. Hongk. (1861) 44; A. W. Benn. in Hook. f. Fl. Brit. Ind. **1** (1872) 206; Forbes & Hemsl. Journ. Linn. Soc. Bot. **23** (1886) 60.

MINDANAO, Lake Lanao, Camp Keithley (36 *Mrs. Clemens*) February, 1906.

A species not previously reported from the Philippines, according to Bennett extending from the Eastern Himalayan region to the Eastern Archipelago and

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[14] Rev. Pl. Vasc. Filip. (1886), 75.

China, and according to Forbes and Hemsley from Southern China to the Eastern Himalayan region southward through the Malayan Peninsula. King,[15] however, does not record the species from the Malayan Peninsula.

Polygala luzoniensis Merrill sp. nov.

A perennial herb, prostrate, branched from the base, the branches slender, pubescent, 10 to 30 cm. long. Leaves oblong-ovate, acute, firm, 1 to 1.5 cm. long, 5 mm. wide or less, the base obtuse or rounded, rarely subacute, the petiole very short, margins somewhat recurved, the nerves 3 to 4 on each side of the midrib, not prominent, glabrous or slightly pubescent on the midrib on both surfaces. Flowers in short few flowered axillary racemes, the bracts small, caducous. Outer sepals subequal, 2 mm. long, oblong, obtuse, their margins with few hairs, the inner sepals petaloid, elliptical-oblong, hyaline, rounded, 5 mm. long, 3 mm. wide, 7-nerved from the base, the reticulations not anastomosing, glabrous, all persistent in fruit. Corolla about 5 mm. long, slightly pubescent below, the lateral petals connate for 2 mm., the free portions oblong, obtuse, 3 mm. long, 1 mm. wide. Keel calyptrate, quite entire, crested, the crest 1.5 mm. long, many cleft, purplish. Staminal tube, free portion, 1.5 mm. long, the filaments united throughout, the anthers sessile on the end of the tube, oblong, about 0.4 mm. long. Ovary glabrous; style curved, 2 mm. long, glabrous; stigma lateral. Fruit flattened, orbicular, 5 mm. in diameter, glabrous, membranous, reticulate-veined, somewhat emarginate, the wing 1 mm. wide. Seed obovoid, 2 mm. long, brown, uniformly but not densely villous, the strophiole with three hyaline appendages, one 2 mm. long, the other two about 1 mm. long.

LUZON, Province of Benguet, Baguio to Ambuklao (4368 *Merrill*) October, 1905. On dry banks in grass lands at an altitude of about 1,600 m.

Polygala septemnervia Merrill sp. nov.

An erect or suberect much branched annual herb 20 to 30 cm. high, with small persistent bracts, and palmately 7-nerved, strongly reticulately veined orbicular-ovate to subelliptical inner sepals. Branches more or less pilose. Leaves lanceolate to oblong-lanceolate or linear-lanceolate, 2.5 to 6 cm. long, 3 to 7 mm. wide, membranous, the margins usually strongly revolute, apex and base acute, with few scattered hairs on the upper surface and margins, the lateral nerves obscure; petioles about 1 mm. long. Racemes axillary and terminal, few or many flowered, the flowers nodding, the axis slightly pubescent, the pedicels slender 2 to 3 mm. long, bracts persistent, lanceolate, acuminate, pubescent, about 1 mm. long. Sepals strongly reticulate-veined, the three outer ones somewhat unequal, oblong to elliptical ovate, obtuse, 2 to 2.5 mm. long, their margins minutely ciliate, the two inner ones petaloid, suborbicular ovate to subelliptical, rounded, 4 mm. long in anthesis, 5 to 7 mm. long in fruit, membranous, strongly palmately 7-nerved, the reticulations anastomosing, the margins slightly ciliate. Corolla about 4 mm. long, pale or purplish, the lateral lobes 2.3 mm. long, 1.3 mm. wide, obovate, obtuse, reticulate, the keel about 3 mm. long, crested, the crest purple, fimbriate, 1 to 1.3 mm. long. Filaments slender, about 1 mm. long; anthers oblong-obovoid, about 0.3 mm. long. Ovary sparingly ciliate, compressed; style glabrous, about 3 mm. long the stigma lateral. Capsule elliptical, flattened, membranous laxly reticulate veined, about 4.5 mm. long, with very narrow marginal wings which are sparingly ciliate. Seed elliptical or oblong elliptical, black, 3 mm. long, strophiolate, densely hirsute especially, above with, grayish or brownish hairs, the strophiole nearly white, about 0.8 mm. long, 3-appendiculate.

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[15] Material for the Flora of the Malayan Peninsula (1889).

LUZON, Province of Benguet, Ambuklao to Daklan (4401 *Merrill*) October 25, 1905, in open grass lands at about 1,000 m.; Bued River (4263 *Merrill*) October 20, 1905, on open rock slopes at about 1,000 m.

SALOMONIA Lour.

Salomonia cylindrica Blume. *Epirhizanthe cylindrica* Blume; Miq. Fl. Ind. Bat. 1 (1859) 2: 128. *t. 15.*

LUZON, Province of Benguet, Sablan (6054 *Elmer*) April, 1904.

This species is here first credited to the Philippines, and is apparently rare, as Mr. Elmer found but three individuals, and no other collector has as yet detected it in the Philippines. It was previously known from Java and Sumatra. The Philippine specimens are evidently referable to Blume's species, rather than to the more widely distributed *Salomonia aphylla* Griff., which extends from China to Borneo, Malacca and Tenasserim.

EUPHORBIACEÆ.

BACCAUREA Lour.

Baccaurea gracilis Merrill sp. nov. § *Pierardia.*

A tree 6 to 10 m. high, quite glabrous throughout, with membranous oblong to oblong-lanceolate leaves, slender fascicled racemes of staminate flowers, the pistillate inflorescence short, racemose, both from the slender branches below the leaves and in the axils of the lower leaves. Branches light gray or brown, slender, terete, lenticellate, glabrous. Leaves shining on both surfaces, 10 to 16 cm. long, 3 to 5 cm. wide, short acuminate, the base acute, entire, glabrous; primary nerves 10 to 12 on each side of the midrib, spreading, distant, the secondary nerves and reticulations evident, rather lax; petioles rather stout, about 5 mm. long. Staminate inflorescence: Racemes slender, glabrous, 5 to 9 cm. long, 1 to 4 in the axils of the lower leaves or of fallen leaves, the flowers glomerate, about 10 in each glomerule, the glomerules scattered, bracts small, the pedicels very short. Sepals 5, imbricate, glabrous, orbicular, about 1.3 mm. long. Petals 0. Stamens 5, the filaments very short; anthers 1 mm. long. Rudimentary ovary present, glabrous, 2-cleft, the disk wanting. Pistillate inflorescence: Racemes 5 mm. long or less, sometimes reduced to fascicles in the axils of fallen leaves. Sepals 5. Ovary glabrous, 3-celled, each cell 2-ovuled. Flowers one in each bract, subsessile. Fruit about 4 mm. long, somewhat flattened vertically, 6 mm. wide, obscurely 3-lobed, 3-celled, dehiscent, each cell 2-seeded, the pedicel in infrutescence slender, 1 to 1.5 cm. long.

PALAWAN, Puerto Princesa (218, 258 *Bermejos*) December, 1905; Panacan Point (3828 *Curran*) March, 1906. In forests near the seashore.

CLAOXYLON Juss.

Claoxylon elongatum Merrill sp. nov. § *Euclaoxylon*.

A tree about 10 m. high with oblong to oblong-lanceolate, acuminate leaves and slender elongated staminate inflorescence much exceeding the leaves. Branchlets slightly pubescent. Leaves membranous, rigid, 12 to 20 cm. long, 4 to 6 cm. wide, scabrous, the base acute, the apex rather slenderly acuminate, the margins distantly serrate, the upper surface glabrous, dull, scabrid with numerous densely disposed small white dots, the lower surface paler, slightly pubescent on the nerves, becoming nearly glabrous; lateral nerves prominent beneath, 5 to 6 on each side of the midrib, curved-ascending, the reticulations distinct; petioles 4 to 7 cm. long, slightly pubescent. Staminate inflorescence slender, axillary, solitary, 13 to 30 cm. long, many flowered, the axis rather densely hirsute pubescent. Flowers glomerate, white, sessile or short pediceled, 3 or 4 in the axil of each bract, the glomeruli scattered, the bracts densely pubescent, 1 to 1.5 mm. long. Sepals 3, oblong ovate, acute, glabrous or slightly ciliate on the margins, about 3 mm. long. Stamens about 25; filaments glabrous, about 1.5 mm. long; anther cells basifixed, about 0.5 mm. long. Disk glands scattered among the stamens, ovate to obovate, obtuse, densely ciliate above, about 0.8 mm. long. Pistillate flowers and fruits not seen.

LUZON, Province of Laguna, Mount Maquiling (5141 *Merrill*) March 17, 1906. In forests on steep slopes at about 150 m.

Claoxylon purpureum Merrill sp. nov. § *Euclaoxylon*.

A shrub about 5 m. high, with shining, few nerved, usually purplish, glabrous leaves and short, few flowered, axillary racemes, dioecious. Branches light gray, glabrous, the ultimate branchlets often slightly pubescent. Leaves oblong ovate to elliptical oblong, or obovate, submembranous, the apex short acuminate, often abruptly so, narrowed below to the acute base, the margins distantly sinuate crenate or dentate to subentire; nerves 5 to 6 on each side of the midrib, distant, prominent, curved-ascending, interarching, the reticulations prominent, lax; petioles 0.5 to 1.5 cm. long, glabrous or nearly so. Inflorescence slender, 4 cm. long or less, axillary, slightly pubescent. Female flowers few. Ovary 2-celled, each cell 1-ovuled; style cleft nearly to the base, the two arms recurved, about 2 mm. long. Male flowers: Sepals 3, valvate, elliptical, ovate, about 2 mm. long, acute. Petals 0. Stamens about 16; filaments about 1 mm. long; anther cells spreading or ascending, about 0.7 mm.

long; disk glands about 0.8 mm. long, among the filaments, slightly ciliate at the apex, the staminate flowers apparently but one in each bract. Fruit glabrous, purplish, 2-celled, each cell 1-seeded, about 6 mm. long.

LUZON, Province of Benguet, Suyoc to Pauai (4689 *Merrill*) November 7, 1905, staminate and pistillate flowers from different plants; Baguio (6307 *Elmer*) May, 1904; Mount Santo Tomas (6545, 6548 *Elmer*) June, 1904. Abundant in the mossy forests in the mountains and on high ridges above 2,000 m.

MACARANGA Thouars.

Macaranga dipterocarpifolia Merrill sp. nov. § *Mappa*.

A shrub or small tree reaching a height of about 7 m. Branches reddish brown, glabrous. Leaves ovate, glabrous, 13 to 20 cm. long, 8 to 12 cm. wide, subcoriaceous, glabrous, penninerved, the base broad, truncate, somewhat auriculate at the insertion of the petiole and with several large glands at the base on the upper surface, the margins irregularly repand-crenate, usually dull, the lower surface with numerous small glands, usually paler than the upper surface, 7 to 9 nerved from the base, the lower nerves short; lateral nerves prominent, spreading, subparallel, 10 to 13 on each side of the midrib, the lower pair (basal) sending stout branches toward the margins, the reticulations subparallel, distinct; petioles 5 to 10 cm. long, glabrous. Male inflorescence glabrous, paniculate, from the upper axils, 10 to 15 cm. long. Flowers numerous, yellowish, fasciculate in the axils of the bracts, the bracts linear, 5 to 7 mm. long or less, enlarged and with 1 to 3 or 4 large disk-like glands above, often somewhat enlarged below and with one or two lobes. Sepals 3, 1 to 1.2 mm. long, glabrous, elliptical-ovate, acute. Stamens 7 to 9; filaments 1 mm. long or less; anthers 4-celled. Pistillate flowers and fruit not seen.

LUZON, Province of Benguet, Sablan (6137 *Elmer*) April, 1904. Not common on dry open ridges.

A species resembling *Macaranga cumingii* Muell. Arg., but with much larger leaves and more numerous stamens, the shape and venation of the leaves resembling some species of *Dipterocarpus*, from which character the species is named. The same species has been collected (sterile) by *Whitford*, in the canyon of the Lamao River, Province of Bataan, Luzon, altitude 700 m.

CORIARIACEÆ.

CORIARIA Niss.

Coriaria intermedia Matsum. Bot. Mag. Tokyo **12** (1898) 62.

LUZON, Province of Benguet, Suyoc to Pauai (4800 *Merrill*) November 7, 1905. In ravines at about 2,000 m. Formosa.

Specimens of the above number were sent to Dr. J. Matsumura, of the Botanical Institute, Imperial University, Tokyo, Japan, for comparison with the type of his Formosan species, and after comparing the specimens, he expresses the opinion that the Luzon plant is identical with his *Coriaria intermedia*. Specimens collected in Benguet by Vidal, and recorded by him as "C. sp. (aff. *C. japonica*

A. Gray)"[16] are undoubtedly referable to *Coriaria intermedia* Matsum. The thirteen known species of the genus have a peculiar geographical distribution, extending from the Mediterranean region to the mountains of British India, China, Japan and Formosa, and from New Guinea to New Zealand, Mexico, and South America. The presence of this Formosan species in Benguet adds another very characteristic species to the known northern element in the Philippine flora.

RHAMNACEÆ.

ZIZYPHUS Juss.

Zizyphus cumingiana Merrill sp. nov. *Zizyphus* aff. *Z. baclei* DC., Vidal, Phan. Cuming. Philip. (1885) 104.

A scandent shrub reaching a height of 10 m., with broadly-ovate to oblong-ovate, inequilateral, nearly glabrous, 3-nerved leaves, the lateral nerves branched, solitary spines and sessile or short-peduncled cymes about equaling the petioles. Branches dark brown, the older ones lenticellate, glabrous, the branchlets slender, more or less ferruginous pubescent, the spines stout, recurved, short. Leaves submembranous, shining, glabrous, or when young the nerves on both surfaces somewhat pubescent, the margins obscurely crenate or dentate, the teeth often apiculate, 4 to 6 cm. long, 2 to 3.5 cm. wide, the base rather strongly inequilateral, broad, rounded, sometimes subcordate, the apex acuminate, the acumen blunt, often obscurely apiculate; nerves 3, the lateral ones scarcely reaching the apex of the leaf and sending rather bold, curved-ascending branches toward the margin, the lower branches often similating basal nerves, so that sometimes the leaves appear to be 4 or 5-nerved; petioles 6 to 8 mm. long, usually somewhat pubescent. Cymes about 8 mm. long, few flowered, slightly ferruginous-pubescent. Flowers greenish white, about 4 mm. in diameter, the pedicels 2 to 4 mm. long. Calyx glabrous or with very few hairs outside, the lobes ovate, acute, nearly 2 mm. long, keeled within. Petals about 1.5 mm. long, obovate-spatulate, cucullate, clawed. Disk glabrous, 10-crenate. Fruit obovoid, glabrous, black when dry, 1-celled, 1-seeded, 6 to 7 mm. long.

PHILIPPINES (453 *Cuming*) 1836–1840. LUZON, Province of Tayabas, Mount Banajao (994 *Whitford*) October, 1904. MINDORO, Bongabong River (3616 *Merritt*) February, 1906. PALAWAN (Paragua) Puerto Princesa (354 *Bermejos*) February, 1906; E-wi-ig River (690 *Merrill*) February, 1903. In forests and thickets from the sea level to 650 m. A species apparently related to *Zizyphus celtidifolius* DC., and *Z. timorensis* DC.

TILIACEÆ.

TRICHOSPERMUM Blume.

Trichospermum trivalvis Merrill sp. nov.

A small tree 6 to 8 m. high with oblong-ovate, cordate, often somewhat inequilateral serrate leaves and 3-valved triangular capsules. Branches nearly black when dry, glabrous, terete, the younger parts somewhat ferruginous pubescent. Leaves 10 to 20 cm. long, 5 to 12 cm. wide, submembranous, the base broad, cordate, usually somewhat inequilateral, the apex acuminate, the margins rather finely irregularly serrate, pubescent on the nerves and midrib above, paler and rather densely stellate pubescent beneath; the base 5-nerved, the lateral nerves prominent, 5 to 6 on each side of the midrib, ascending, the reticulations rather lax; petioles 5 to 10 mm. long, densely pubescent. Inflorescence of axillary, peduncled cymes 4 to 7 cm. long, the peduncles, branches, pedicels, and calyces densely uniformly ferruginous stellate pubescent, the peduncles 1.5 to 3 cm. long. Pedicels about 5 mm. long. Sepals free, oblong, acute, 7 to 8 mm. long, about 2.5 mm. wide, densely stellate pubescent outside, glabrous inside. Petals 5, about 6 mm. long, 1.5 to 2 mm. wide, acute, glabrous except at the thickened base which is rather densely pubescent. Stamens indefinite, inserted on the inside of a short densely villous disk; filaments slender, glabrous, 3 to 4 mm. long; anthers broad, about 0.5 mm. long. Ovary sessile, oblong, densely villous, 3-celled, each cell many ovuled. Style about 1.5 mm. long, expanded upward into the broad somewhat cleft stigma. Capsule nearly 1 cm. long, triangular, 3-valved, the style persistent, the valves pale and glabrous inside, densely ferruginous villous outside. Seeds many, 1.5 to 2 mm. long, compressed, the hairs of the arillus long.

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[16] Rev. Pl. Vasc. Filip. (1886), 102.

LUZON, Province of Rizal, Antipolo (398 *Ahern's collector*) February, 1904; Bosoboso (1161 *Ahern's collector*) June, 1904. MINDORO, Bongabong River (1391 *Whitford*) January, 1906.

The first species of the genus to be reported from the Philippines, differing from all other described ones in its 3-valved capsules. Of the three other known species of the genus one is found in Java, one in the Fiji Islands, and one in Perak and the Nicobar Islands.

MALVACEÆ.

ABELMOSCHUS Medik.

Abelmoschus luzoniensis Merrill sp. nov. *A. moschatus* Perk. Frag. Fl. Philip. (1904) 111, in part.

An erect, herbaceous, somewhat branched annual, the vegetative portions densely velutinous pubescent and with scattered simple or stellately disposed bristle-like hairs, the bracteoles 5 to 7, ovate-lanceolate. Branches terete, the pubescence and bristles cinereous to fulvous, the latter few or many. Leaves 9 to 15 cm. long, cordate, deeply palmately 5-lobed, rather densely pubescent on both surfaces and with few or many stellately disposed bristle-like hairs, the outer lobes short, the others 7 to 13 cm. long, lanceolate, rather coarsely lyrately lobed, acuminate; petioles 8 cm. long or less, densely pubescent and with few bristles; stipules linear, about 7 mm. long. Flowers forming terminal racemes, yellow, the pedicels equaling the petioles, similarly pubescent. Bracteoles ovate lanceolate to oblong, 5 to 7, at length deciduous, 1 to 2.5 cm. long, 6 to 10 mm. wide, acute, densely pubescent outside and with few stellately disposed hairs inside. Calyx about 2 cm. long, cleft down one side, toothed at the apex, deciduous, densely pubescent outside, slightly so within. Corolla 6 cm. long or less, yellow. Capsule oblong ovoid, acute, 5-angled, 4 to 5 cm. long, about 2 cm. thick, the valves somewhat pubescent outside and beset with simple bristle-like hairs, inside slightly pilose. Seeds many, pubescent, about 3.5 mm. long.

LUZON, Province of Rizal, Tanay (2328 *Merrill*) May, 1903; Antipolo (1307 *Merrill*) February, 1903; Bosoboso (1864 *Ahern's collector*) September, 1904. Apparently a distinct species not at all closely related to *Abelmoschus moschatus* Moench., to which the first two numbers cited were referred by Perkins. Distinguished at once from the latter species by its broad bracteoles.

Abelmoschus multilobatus Merrill sp. nov.

An erect branched herb 1 to 2 m. high, the vegetative portions beset with few or many simple bristle-like hairs each from a small papilla, otherwise glabrous, with deeply, narrowly palmately 7-lobed leaves, the lobes again coarsely irregularly lyrately lobed. Branches stout, terete, the bristles usually numerous. Leaves 12 to 20 cm. long, deeply cordate, the lobes narrow, lanceolate, acuminate, 9 to 17 cm. long, the lobules 3 cm. long or less, often coarsely irregularly toothed; petioles 18 cm. long or less, usually hispid; stipules linear, about 8 mm. long. Flowers yellow, their pedicels 10 cm. long or less. Bracteoles 6 to 8, lanceolate, about 1.5 cm. long, 5 mm. wide, acuminate, with few scattered hairs and bristles, becoming nearly glabrous. Calyx rather densely pubescent outside, somewhat pilose within, about 2 mm. long, deciduous, the apex rather coarsely toothed. Petals yellow, 6 to 8 cm. long. Ovary pubescent. Staminal column antheriferous throughout. Capsule (immature) ovoid, densely beset with simply disposed bristles, exceeding the bracteoles.

LUZON, Province of Bataan, Lamao River (1820, 1902 *Borden*) September, November, 1904; (6739 *Elmer*) November, 1904: Province of Union, Bauang (14 *Fenix*) October, 1905. All the above were distributed as *Abelmoschus moschatus* Moench., and the material from the Province of Bataan was so enumerated by the author.[17] The species is, however, very distinct from *A. moschatus* Moench.

DILLENIACEÆ.

SAURAUIA Willd.

Sauraua clementis Merrill sp. nov.

A shrub or small tree, the branches, leaves, and inflorescence with numerous linear, subulate chaffy bristles. Branches terete, brown, the bristles many, short and long intermixed. Leaves membranous, slightly shining, elliptical-obovate to oblong-obovate, 10 to 16 cm. long, 4 to 7 cm. wide, rather dark above, paler beneath, somewhat narrowed below to the acute, rarely obtuse base, more abruptly narrowed above to the short acuminate apex, both surfaces with numerous subulate bristles which are more numerous beneath, especially on the midrib and nerves, the margins subentire or bristly toothed above; nerves 7 to 8 on each side of the midrib, rather prominent beneath; petioles about 1 cm. long, densely bristly. Inflorescence axillary, peduncled, cymose, few flowered, 4 to 8 cm. long, densely bristly throughout, the bracts lanceolate, acuminate, 8 to 9 mm. long, about 2 mm. wide. Sepals 5, imbricate, ovate, acute or acuminate, about 8 mm. long, the exposed outer surfaces thickly beset with subulate dark purple bristles about 3 mm. long, the outer three sepals coriaceous, the inner two membranous. Corolla about 10 mm. long, the lobes obovate, rounded, strongly irregularly retuse. Stamens 20; anthers 3 mm. long. Ovary glabrous, 3-celled; styles 3, 6 mm. long, united for the lower 1 mm.

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[17] *Phil. Journ. Science Suppl.* (1906), **1**: 92.

MINDANAO, Lake Lanao, Camp Keithley (57 *Mrs. Clemens*) January, 1906.

Saurauia longistyla Merrill sp. nov.

A tree about 10 m. high, nearly glabrous throughout, with oblong leaves and fasciculate or solitary flowers on the branches below the leaves, the ovary 3-celled, the styles 3, united below. Branches light gray, glabrous, striate, the tips with few appressed, pale, triangular to narrowly ovate scales. Leaves 20 to 28 cm. long, 6 to 9 cm. wide, glabrous above, paler and quite glabrous beneath or with few scattered appressed scales, firm, shining, narrowed below to the acute base, the apex short acuminate, the margins above serrate or spinulose-serrate, entire below; nerves about 14 on each side of the midrib, prominent beneath, scarcely anastomosing, the reticulations subparallel, distinct; petioles 1 to 2.5 cm. long, with few appressed scales, becoming glabrous or nearly so. Flowers solitary or two or three in a fascicle in the axils of fallen leaves, white or pink, about 2 cm. in diameter, the pedicels 0.5 to 2 cm. long, with few appressed scales, the bracts about 8 mm. long, 3 mm. wide, acute or obtuse, oblong, glabrous. Sepals 5, glabrous, concave, elliptical to obovate, 8 to 10 mm. long, 6 to 8 mm. wide, rounded at the apex, subequal. Corolla lobes oblong-obovate, 10 mm. long, 6 mm. wide, glabrous, irregularly retuse at the apex. Stamens about 30, inserted on the base of the corolla; filaments about 4 mm. long, anthers 2 mm. long, 1.5 mm. thick. Ovary glabrous, 3-celled; styles 3, united for the lower 2 to 3 mm., the free portions 7 to 8 mm. long.

PALAWAN (Paragua), San Antonio Bay (835 *Merrill*) February 18, 1903. In forests at about 500 m.

Saurauia luzoniensis Merrill sp. nov.

A shrub, the branches, inflorescence, calyx lobes and petioles, minutely ferruginous pubescent and beset with setiform scales or scale-like hairs, the cymes axillary, solitary, 1 to 3 cm. long, few, 3 to 5-flowered, the ovary cells and styles 3. Branches brown, the older ones becoming glabrous. Leaves oblong to broadly oblong-oblanceolate, membranous, 10 to 17 cm. long, 3 to 6 cm. wide, somewhat shining when dry, paler beneath, the midrib, nerves and reticulations beneath with few scattered appressed scale-like hairs, the upper surface quite glabrous or with few scales on the midrib, the margins spinulose serrate, often obscurely so, the apex short acuminate, narrowed below to the acute base; nerves about 13 on both sides of the midrib, distinct beneath, anastomosing, the reticulations netted, distinct; petioles 1 to 2 cm. long. Cymes few flowered, strigose, the bracts and bracteoles linear, acute or apiculate, 3 to 4 mm. long, 1 mm. wide. Flowers pink, about 13 mm. in diameter. Sepals 5, equal, oblong-ovate of oblong-obovate, 6 mm. long, 4 mm. wide, rounded at the apex, outside ferruginous pubescent or puberulent and beset with pale, strigose, awl-shaped, scale-like hairs 1 to 2 mm. long. Corolla glabrous, the lobes 5, oblong-ovate, irregularly retuse at the apex, about 7 mm. long, 4 to 5 mm. wide. Stamens 20; filaments more or less united, about 2.5 mm. long; anthers nearly 3 mm. long. Ovary minutely densely pubescent, 3-celled; styles 3, about 3 mm. long, slightly united at the base.

LUZON, Province of Rizal, Bosoboso (2902, 3101 *Ahern's collector*) March, May, 1905.

VIOLACEÆ.

RINOREA Aubl.

Rinorea palawanensis Merrill sp. nov. § *Prothesia.*

A shrub 2 to 4 m. high with membranous, nearly glabrous, oblong to obovate-oblong, acuminate leaves and few, axillary, fascicled or racemosely disposed flowers, the anther cells with a short mucro, the connective with a large, ovate appendage. Branches gray, becoming glabrous, the younger ones somewhat pubescent. Leaves alternate, 15 to 27 cm. long, 6 to 9 cm. wide, irregularly crenate-dentate to subentire, shining, paler beneath, slightly pubescent on the nerves and midrib beneath, becoming quite glabrous, usually rather prominently acuminate, narrowed below to the rather abruptly acute, often somewhat inequilateral base; nerves 12 to 13 on each side of the midrib, distinct, distant 1.5 to 3 cm., anastomosing, the reticulations lax, distinct. Flowers fascicled or in short few flowered racemes, about 5 mm. long, greenish, the inflorescence pubescent, the pedicels 6 mm. long or less, the sepals and petals accrescent in fruit and persistent. Sepals narrowly ovate, acute, densely hirsute pubescent outside, less so within. Petals narrowly ovate, acute, 3 to 4 mm. long, somewhat pubescent outside. Stamens from the margin of the disk; anthers broadly ovate, 1.5 to 1.7 mm. long, each cell tipped with short mucro 0.3 mm. long or less, the connective with a broad, ovate, acute, subhyaline appendage from the middle, nearly 1.5 mm. long. Ovary somewhat ferruginous hirsute; style 2 mm. long, narrowed above. Capsule ovoid, 1 cm. long, obtusely obscurely 3-angled, glabrous or with few ferruginous hairs. Seeds few, glabrous, shining.

PALAWAN, Puerto Princesa (252 *Bermejos*) December, 1905; (3529 *Curran*) January, 1906. In forests.

LECYTHIDACEÆ.

BARRINGTONIA Forst.

Barringtonia curranii Merrill sp. nov. § *Stravidium*.

A tree 4 to 6 m. high, glabrous except the inflorescence, with large or very large oblanceolate leaves, elongated racemes, and 4-merous flowers which are about 7 cm. across when open, the fruits elliptical-obovoid, crowned by the calyx lobes, terete or very obscurely 4-angled, 7 cm. long, about 4 cm. thick. Branches thickened, light gray, the leaf scars rather large. Leaves alternate, crowded at the apices of the branchlets, subcoriaceous, rather pale when dry, shining, 20 to 60 cm. long, 6 to 12 cm. wide, the margins obscurely minutely but distantly toothed, the apex acuminate, gradually narrowed below to the attenuate base, the petiole stout, less than 1 cm. long; nerves 18 to 24 on each side of the midrib, very prominent, the reticulations evident. Racemes pendulous (1 m. long according to Bermejos) stout, ferruginous-puberulent. Flowers pink or red, sessile. Calyx tube about 8 mm. long, obscurely 4-angled, densely ferruginous mealy puberulent, the lobes 4, broadly ovate or orbicular-ovate, rounded, less than 1 cm. long, densely ferruginous mealy puberulent, the margins slightly ciliate. Petals 4, obovate, rounded, 3.5 cm. long, about 2 cm. wide. Stamens indefinite, the filaments 4 to 5 cm. long. Ovary 4-celled; style about 7 cm. long. Fruit wrinkled when dry, somewhat ferruginous puberulent, with a single large seed.

PALAWAN, near Puerto Princesa (3596 *Curran*) January 30, 1906; (225 *Bermejos*) December 14, 1905. In forests and old clearings 20 m. or more above the sea level.

Barringtonia revoluta Merrill sp. nov. § *Butonica*.

A tree about 12 m. high, quite glabrous, with oblong-lanceolate to oblong-oblanceolate entire leaves, the margins strongly revolute, elongated, slender, recemose inflorescence and 3-merous flowers, the calyx tube sharply 3-angled, the lobes and petals 3, and the ovary 3-celled. Branches slightly thickened, strongly rugose when dry, brown or grayish. Leaves alternate, crowded at the ends of the branchlets, subcoriaceous, pale and shining when dry, 15 to 24 cm. long, 3 to 6 cm. wide, the apex acute or slightly acuminate, gradually narrowed below to the attenuate base, the petiole proper stout, rugose, less than 1 cm. long; nerves about 14 on each side of the midrib, the reticulations rather lax, distinct. Racemes 40 to 50 cm. long or more, the flowers few, scattered, their pedicels about 1 cm. long. Flowers immature. Calyx tube narrowed below to the pedicel, sharply 3-angled, closed in bud, splitting into three broadly ovate, rounded lobes, which are sometimes minutely apiculate at the apex. Petals 3, free, elliptical ovate, rounded. Stamens indefinite; anthers 0.8 mm. long. Ovary 3-celled, each cell with 3 or 4 pendulous ovules from the upper inner angle. Fruit and mature flowers not seen.

PALAWAN, Iwahig Penal Settlement (3507 *Curran*) January 7, 1906. A tree not common along the river, slightly above sea level.

A very characteristic species, readily recognized by its entire strongly revolute leaves and 3-merous flowers.

COMBRETACEÆ.

COMBRETUM Linn.

Combretum sexalatum Merrill sp. nov.

A scandent shrub, nearly glabrous, with opposite, oblong-ovate leaves, terminal and axillary panicles, the flowers crowded at the ends of the panicle branches, 4-merous flowers and prominently membranously 6-winged fruits, apparently dehiscent. Branches glabrous, brownish or grayish, terete, the ultimate branchlets somewhat pubescent. Leaves membranous or chartaceous, shining, the base acute or rounded, the apex short broadly acuminate, entire, 8 to 10 cm. long, 4 to 7 cm. wide, when very young more or less glandular-lepidote, becoming quite glabrous, or the nerve axils beneath barbellate; nerves 7 to 8 on each side of the midrib, somewhat prominent, the reticulations distinct; petioles 1.5 to 2 cm. long. Panicles 8 to 13 cm. long, the axis and branches densely pubescent, the lower branches subtended by leaves, the flowers densely racemosely disposed at the ends of the branchlets. Flowers yellow, obscurely glandular lepidote, the pedicels 4-angled, gradually merged into the calyx, the flower and pedicel about 12 mm. long, the buds acute. Calyx gradually wider upward, expanded above and villous at the throat within, the limb 4-lobed, the lobes reflexed, ovate, sharply acute, 3 mm. long. Petals 4, oblong, truncate, slightly exceeding 2 mm. in length. Stamens 8, exserted; filaments nearly 6 mm. long; anthers nearly 1 mm. long. Style 10 to 12 mm. long. Fruit apparently dehiscent, including the wings elliptical in outline, 3 to 5 cm. long, 2.5 to 4 cm. wide, the seed-bearing portion 1.3 cm. long or less, the back of each valve with a thin membranous wing about 1.5 cm. long, 0.5 mm. wide, the margins of the 3 valves expanded into membranous, reticulately veined wings quite surrounding each valve, 1.5 to 2 cm. wide, the free edges forming 6 longitudinal wings.

LUZON, Province of Rizal, Antipolo (3130 *Ahern's collector*) June, 1905 (flower); Bosoboso (1868, 3321 *Ahern's collector*) September, 1904, September, 1905 (fruit). The last number cited has much broader leaves and larger fruits than the others.

MYRTACEÆ.

EUGENIA Linn.

Eugenia mimica Merrill sp. nov. § *Jambosa*.

A glabrous shrub 1 to 3 m. high with subcoriaceous, lanceolate, oblanceolate or oblong-oblanceolate, acute or blunt leaves, terminal cymose panicles 6 cm. long or less, the flowers small, white, the buds narrowly oblong-obovoid or club-shaped. Branches gray or brownish, terete, the branchlets sharply 4-angled. Leaves 4.5 to 9 cm. long, 1 to 1.5 cm. wide, shining above, paler and dull beneath, narrowed above to the acute or blunt apex and below to the narrow acute base, the margins somewhat recurved; primary nerves about 10 on each side of the midrib, distant, irregular, spreading, not prominent, anastomosing and forming a marginal nerve, the reticulations evident, netted; petioles 2 to 4 mm. long. Flowers usually in groups of threes at the tips of the branchlets of the inflorescence, the lower branches sometimes 3 to 4 cm. long, the flowers including the stamens 10 to 12 mm. long, narrow, the buds about 8 mm. long. Calyx truncate about 4 mm. in diameter at the mouth, cup-shaped, narrowed below into a 4 to 5 mm. long pseudostalk, glabrous. Petals 4, free, orbicular, 2.5 to 3 mm. in diameter, caducous. Stamens indefinite; filaments about 4 mm. long; anthers 0.3 mm. long. Fruit oblong-ovoid to ellipsoid, glabrous, dark purple when mature, about 1 cm. long, 7 to 8 mm. thick, crowned by the persistent calyx rim, with a single large seed, the pericarp thin, crustaceous when dry.

LUZON, Province of Rizal, Montalban (5034 *Merrill*) March 8, 1906; (3431 *Ahern's collector*) November, 1905.

A shrub growing on cliffs and boulders along the river at an altitude of about 40 m., associated with and similating in habit *Atalantia linearis* (Blanco) Merr. Like *Atalantia linearis* and *Homonoya riparia*, this species is often found on ledges and boulders subject to overflow in times of high water, and like the former species is abundant along the river at Montalban in the limestone region, but is found only immediately bordering the stream. So close is the resemblance in habit and leaf characters between this species and *Atalantia linearis* that Ahern's collector, *Ramos*, brought in both under one number as being the same species.

MELASTOMATACEÆ.

ASTRONIA Blume.

Astronia lagunensis Merrill sp. nov.

A shrub 4 to 6 m. high, nearly glabrous throughout except the inflorescence, with oblong-elliptical, acuminate, 7-nerved leaves, and furfuraceous inflorescence, the orbicular petals about 5 mm. in diameter. Branches rather stout, obscurely 4-angled, brown, glabrous. Leaves subcoriaceous, glabrous and green on both surfaces, not furfuraceous, 14 to 18 cm. long, 4 to 8 cm. wide, equally narrowed below to the acute base and above to the acuminate apex, the transverse nerves numerous, prominent beneath; petioles stout, 3 to 6 cm. long, when young slightly furfuraceous, becoming quite glabrous. Panicles pyramidal, 5 to 7 cm. long, 5 to 8 cm. wide below, the axis and opposite branches brown furfuraceous, the lower branches spreading, 4 cm. long or less, the upper ones gradually shorter. Flowers yellowish white and red. Calyx broadly funnel-shaped, about 4 mm. long, 5 to 6 mm. in diameter above, slightly furfuraceous, with 5 broad acute teeth less than 1 mm. long. Petals 5, orbicular, 5 mm. in diameter. Stamens 10; filaments strap-shaped, 4 mm. long, 1 mm. wide; anthers dolabriform, 2 mm. long. Style about 6 mm. long.

LUZON, Province of Laguna, Mount Maquiling (5144 *Merrill*) March 17, 1906. Rather common in the mossy forest at an altitude of about 1,100 m. A species apparently related to *Astronia macrophylla* Blume, differing from that species in its smaller leaves and much larger flowers.

MEDINILLA Gaudich.

Medinilla bolsteri Merrill sp. nov.

An erect glabrous shrub, 2 to 3 m. high, with opposite, petioled, 5-nerved leaves, the transverse nerves evident, and fascicled or solitary lax cymes 10 to 15 cm. long from tubercles on the trunk, the flowers 5-merous. Branches light gray or greenish, glabrous, terete. Leaves membranous or chartaceous, elliptical to oblong-elliptical, short acuminate, the base acute, 13 to 20 cm. long, 7 to 9 cm. wide, 5-nerved, the exterior submarginal nerves from the base, the inner pair from the midrib 2 to 3 cm. above the base, the transverse nerves somewhat prominent. Peduncles to the cymes slender, 4 to 5 cm. long, the branches slender, opposite or whorled, divaricate, the flowers mostly subumbellately disposed at the tips of the branchlets, the pedicels 0.5 to 1 cm. long, ebracteolate. Flowers pink. Calyx cup-shaped, 4 mm. long, subtruncate or with 5 shallow teeth. Petals 5, obtuse, irregularly obliquely oblong obovate, 8 to 9 mm. long, 3 to 3.5 mm. wide. Stamens 10, subequal; filaments 4 mm. long; anthers 3 mm. long, acuminate. Style slender, glabrous, 7 mm. long.

LUZON, Province of Rizal, Bosoboso (3262 *Ahern's collector*), August 21, 1905 (type): Province of Cagayan, Tabug (173 *F. H. Bolster*) August 15, 1905. In shaded thickets by streams at about 250 m.

Medinilla dolichophylla Merrill sp. nov.

A glabrous shrub 3 to 5 m. high with 4-merous flowers, terminal and lateral long peduncled inflorescence, and lanceolate leaves 20 to 35 cm. long, the lateral longitudinal nerves faint. Branches quadrangular, the younger ones strongly 4-winged, the wings not undulate. Leaves membranous to subcoriaceous, 4 to 5.5 cm. wide, pale, shining, gradually narrowed above to the somewhat acuminate apex, the base acute, decurrent; midrib stout, the lateral longitudinal nerves four, scarcely more prominent than the distant transverse nerves, the reticulations lax; petioles about 1.5 cm. long. Cymes pendulous, terminal and from the branches below the leaves, the peduncles 15 to 20 cm. long, few flowered, ebracteolate. Calyx 4 to 5 mm. long, truncate, cylindrical or subcampanulate. Petals 4, white, irregularly obovate, narrowed below, about 14 mm. long, 8 mm. wide. Stamens 8, subequal; filaments 6 mm. long; anthers 6 to 7 mm. long, linear, tips purplish, base white, the middle portion yellow, the dorsal basal spur 1 mm. long, anteriorly 2-tuberculate. Style about

12 mm. long. Fruit ovoid, about 1 cm. long. Seeds oblong, rounded at the apex, about 1.5 mm. long.

LUZON, Province of Benguet, Baguio (4332 *Merrill*) October 22, 1905; (44 *Topping*) February, 1903.

A shrub characterized by its elongated, faintly nerved leaves and pendulous inflorescence, growing in damp shaded ravines along small streams at an altitude of about 1,500 m.

Medinilla myriantha Merrill sp. nov.

A shrub 4 to 5 m. high, quite glabrous throughout, with opposite, 7 to 9-nerved sessile leaves and terminal many flowered panicles, the flowers 4-merous. Branches terte, rather slender, the younger ones obscurely angled, the nodes densely barbellate. Leaves subcoriaceous, elliptical ovate, 9 to 13 cm. long, 5.5 to 7 cm. wide, the apex abruptly short acuminate, the base cordate, often broadly so; nerves 7, prominent, sometimes with an additional pair of outer short nerves at the base. Panicles 10 to 20 cm. long, pink, many flowered, the branches verticillate, the lower ones about 9 cm. long, gradually shorter upwards, the bracts minute, subulate. Flowers numerous, pink. Calyx urceolate-cylindrical, 4 mm. long, truncate. Petals 4, oblique, about 8 mm. long. Stamens 8, subequal; filaments 4 mm. long; anthers nearly 5 mm. long, the spur less than 1 mm. long.

LUZON, Province of Laguna, Mount Maquiling (5129, 5133 *Merrill*) March 17, 1906. Abundant in the mossy forest 900 to 1,100 m. A species apparently related to *Medinilla intermedia* Blume, differing from that species in its more numerously nerved, sessile, cordate leaves and larger flowers.

Medinilla teysmanni Miq. Ann. Mus. Bot. Lugd. Bat. 1 (1864) 217; Cogn. in DC. Monog. Phan. 7 (1891) 593.

MINDANAO, Camp Keithley, Lake Lanao (1 *Mrs. Clemens*) December, 1905. A species previously known only from Celebes and New Guinea, the specimen cited above differing from the species, as described, in its somewhat larger flowers but in no essential characters so far as I can detect.

PACHYCENTRIA Blume.

Pachycentria formicaria Merrill sp. nov.

A glabrous or nearly glabrous epiphytic shrub 50 cm. high or less with 3-nerved leaves, the transverse nerves very obscure or obsolete, short petioles, and terminal corymbose inflorescence, the roots with oblong to ovoid thickened bulb-like swellings 1 to 3 cm. in diameter. Branches light gray to brownish, terete, glabrous or the younger branchlets minutely furfuraceous. Leaves coriaceous, oblong to elliptical or ovate oblong, pale when dry, dull, 6 to 12 cm. long, 1.5 to 4.5 cm. wide, entire, the base acute, the apex shortly acuminate, the lateral basal nerves slender, ascending, submarginal, not reaching the apex; petioles 3 to 10 mm. long. Corymbs about 5 cm. long, nearly as wide, many flowered, glabrous or nearly so, the bracteoles minute. Flowers pink. Calyx narrow, urceolate, about 4 mm. long, constricted above the ovary, the limb nearly 2 mm. long, with 4 rounded teeth. Petals 4, ovate-lanceolate, about 5 mm. long, 2.2 mm. wide in the middle, narrowed below and to the acuminate apex. Stamens 8; filaments about 2 mm. long; anthers lanceolate, about 2 mm. long, rostrate, the basal dorsal spur about 0.5 mm. long. Ovary 4-celled; style 5 mm. long.

MINDANAO, Lake Lanao, Camp Keithley (433, 361 *Mrs. Clemens*) March, 1906; (3920 *Hutchinson*) March, 1906.

A typical Malayan genus, of which no species has previously been reported from the Philippines, the present species being well characterized by its thickened bulb-like roots, which are inhabited by colonies of ants, in this respect resembling the symbiosis found in the rubiaceous genera *Hydnophytum* and *Myrmecoidea*.

HALORRHAGACEÆ.

HALORRHAGIS Forst.

In Schindler's recent monograph of this family[18] no species of the genus *Halorrhagis* are credited to the Philippines. Schindler recognizes 59 species of *Halorrhagis*, of which 57 are confined to Australia and New Zealand, one to the Asiatic continent, and one extending over the entire range of the genus, from New Zealand and Australia to Japan, China, and Bengal. Three species of the genus are represented in our Philippine collections, one of which is apparently undescribed.

1. Calyx tube papillose-punctate, the ribs scabrous.
    2. Stamens 6 to 8; inflorescence paniculate; leaves lanceolate, about 1.5 cm. long .... (1) *H. scabra clongata*
    2. Stamens 4; inflorescence racemose; leaves elliptical-oblong, 1 cm. long or less .... (2) *H. philippinensis*
1. Calyx tube quite glabrous, not papillose-punctate, the ribs not scabrous .... (3) *H. micrantha*

(1) **Halorrhagis scabra** (Koenig) Benth., var. **elongata** Schindler in Engler's Pflanzenreich **23** (1905) 28.

CULION (459 *Merrill*) December 13, 1902. In damp deserted rice lands near the sea level.

This variety has previously been known only from southern China, Hongkong, and Annam, although another variety of the same species is found in the Khasia Mountains, British India. The Philippine plant here referred to, *Halorrhagis scabra*, agrees very closely with the description and with specimens from Hongkong kindly supplied me by the Director of the Hongkong Botanic Garden.

(2) **Halorrhagis philippinensis** Merrill sp. nov.

A scabrous herb 8 to 20 cm. high, erect or spreading, more or less branched from the base, with simple racemose inflorescence, the flowers solitary in the axils of the bracts, the calyx manifestly papillose-punctate, scabrous on the ribs but not parallel callose, the stamens four. Branches slender, appressed-pilose, 4-angled. Leaves elliptical oblong, coriaceous, sparingly pilose, 5 to 10 cm. long, 2.5 to 5 cm. wide, short petioled or subsessile, mucronate acuminate or acute, the base acute, the margins usually serrate, strongly cartilaginous. Racemes simple, the pedicels less than 1 mm. long; bracts foliaceous, ovate-lanceolate, 2 to 3 mm. long, sparingly scabrous-pilose; bracteoles 2, membranous, linear, sparingly pilose, 1 to 1.5 mm. long. Calyx 2 mm. long, the tube manifestly papillose-punctate, 8-ribbed, 1 mm. long, the ribs scabrous, the lobes 4, erect, ovate-lanceolate, acute, 1 mm. long, navicular, somewhat pilose on the keel. Stamens 4; anthers 1.2 mm. long. Fruit grayish, somewhat shining.

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[18] Engler's *Pflanzenreich* **23**, 1905.

LUZON, Province of Benguet, Baguio to Ambuklao (4357 *Merrill*) October 24, 1905: District of Lepanto, Suyoc to Cervantes (4444 *Merrill*) October 30, 1905; Mount Data (4553 *Merrill*) November 4, 1904. On dry, open, grassy slopes in thin pine forests, 1,500 to 2,100 m.

(3) **Halorrhagis micrantha** (Thunb.) R. Br. Schindler l. c. 42.

NEGROS, Canlaon Volcano (*Banks*) March, 1902. MINDANAO, District of Davao, Mount Apo (1050 *Copeland*) April, 1904; (1436 *Copeland*) October, 1904, det. Rolfe. "Grows all over the summit but abundant only about pools, 2,600 to 3,000 m." Copeland.

A species not previously reported from the Philippines, extending from Bengal to Japan, Malaya, Australia, and New Zealand.

MYRIOPHYLLUM Linn.

Myriophyllum spicatum Linn. Schindler l. c. 90.

MINDANAO, Lake Lanao, Camp Keithley (450 *Mrs. Clemens*) April, 1906. Altitude about 800 m.

No species of the genus has previously been reported from the Philippines. Widely distributed in the tropical and temperate regions of the world, but not recorded by Schindler from the Malayan region.

ARALIACEÆ.

ACANTHOPANAX Decne. et Planch.

Acanthopanax trifoliatum (Linn.). *Zanthoxylum trifoliatum* Linn. Sp. Pl. (1753) 270. *Panax aculeatum* Ait. Hort. Kew. **3** (1789) 448. *Acanthopanax aculeatum* Seem. Journ. Bot. **5** (1867) 238; Forbes & Hemsl. Journ. Linn. Soc. Bot. **23** (1888) 229. *Aralia trifoliata* Meyen.

LUZON, Province of Benguet, Bugias (4661 *Merrill*) October 28, 1905. In thickets at an altitude of about 1,500 m.

An interesting addition to our knowledge of the relationship of the Philippine flora to that of the Asiatic continent. The above specimen agrees very closely with material of this species supplied me by the director of the Botanic Garden, Hongkong, with Formosan specimens received from the Imperial University, Tokyo, and with sterile specimens in Herb. Bureau of Science from a cultivated plant in the Botanical Garden at Buitenzorg, Java. The Philippine plant is, however, a scandent shrub, while in all the references to *Acanthopanax aculeatum* Seem., and synonyms of that species which I have been able to consult, the species is described as a shrub or small tree. However, I can not, from the descriptions and material available, find any other characters by which the Philippine plant can be distinguished, and have accordingly referred it to the above species, which extends from Japan and Formosa to China and Eastern India.

SCHEFFLERA Forst.

Schefflera luzoniensis Merrill sp. nov. § *Euschefflera, Heptapleurum.*

A scandent shrub, quite glabrous except the deciduously pubescent inflorescence, with 5-foliolate leaves, the leaflets caudate-acuminate, and terminal panicle branched from the base, the branches ascending, elongated, the flowers disposed in 3 to 5 flowered peduncled umbels. Branches light gray, glabrous. Petioles 6 to 8 cm. long, glabrous, slender; leaflets firm, shining, elliptical-lanceolate to narrowly obovate-lanceolate, abruptly long caudate-acuminate, the base acute, 4 to 6 cm. long, 1.5 to 2 cm. wide; primary nerves 6 to 7 on each side of the midrib, not prominent, the secondary nerves and reticulations nearly as evident, anastomosing and forming a marginal nerve, the leaf margin entire, recurved; petiolules 1.5 to 2 cm. long. Panicles 10 cm. long or less, branched from the base, the branches about 8 cm. long, more or less flocculose pubescent, becoming subglabrous, the bracts and bracteoles very caducous, the branchlets racemosely disposed, 5 to 10 mm. long, each bearing 3 to 5 umbellately disposed flowers, the pedicels 3 to 4 mm. long. Calyx about 1.5 mm. long, truncate. Petals 5, oblong-ovate, 2 mm. long, acute, apex inflexed, free, falling separately. Stamens 5; filaments 2 mm. long; anthers broadly elliptical-ovate, about 0.8 mm. long. Ovary 5-celled; style 0. Fruit unknown.

LUZON, Province of Tayabas, Mount Banahao (928 *Whitford*) October 19, 1904. Scandent on trees in forests at about 1,100 m.

Schefflera microphylla Merrill sp. nov. § *Euschefflera, Heptapleurum.*

Subscandent, 2 to 3 m. high; glabrous throughout, with alternate, long petiolate, digitately 5 to 8-foliolate leaves, the leaflets lanceolate, acuminate, 5 cm. long or less, the flowers umbellately disposed in lax terminal panicles. Branches slender, terete, light gray or brownish. Petioles slender, 4 to 5 cm. long; leaflets entire, firm, shining, 3.5 to 5 cm. long, 4 to 6 mm. wide, gradually narrowed above to the long caudate-acuminate apex, the base acute; nerves few, not prominent; petiolules 5 to 8 mm. long. Panicles few branched from the base, 6 to 8 cm. long, the bracts and bracteoles wanting or very caducous, glabrous; branchlets spreading, few, slender, 1 to 1.5 cm. long, the flowers in 4 to 6 flowered umbels at the ends of the branchlets, the pedicels 4 to 6 mm. long. Calyx truncate or obscurely toothed, 1.5 mm. long or less. Petals 5, triangular-ovate, acute, 1.5 mm. long, adherent by their apices and falling as a whole. Stamens 5; filaments about 1 mm. long; anthers broadly ovate, nearly 1 mm. long. Ovary 5-celled; style not developed. Fruit elliptical-ovoid, glabrous, about 5 mm. long, 5-ridged.

LUZON, District of Lepanto, Mount Data (4605 *Merrill*) November, 1905. A subscandent shrub growing on rotten trunks and mossy trees in the wet forest at about 2,200 m., characterized by its small lanceolate leaflets.

TETRAPLASANDRA A. Gray.

Tetraplasandra philippinensis Merrill sp. nov.

A tree 8 to 12 m. high, quite glabrous throughout, with 2 to 8 or more jugate leaves, the leaflets distantly obscurely crenate-serrate, and 7-merous flowers. Leaves alternate, the lower ones much larger than those near the apices of the branches, the latter often reduced to 20 cm. or less in length and 2 to 3 jugate, the former 80 cm. or more in length, 8 or more jugate, the common petiole stout, jointed. Leaflets oblong-ovate to oblong, glabrous and shining above, somewhat dull beneath, 10 to 16 cm. long, 4 to 8 cm. wide, the base rounded or acute, often inequilateral, the apex usually very abruptly short acuminate, the margins with few distant, scattered crenate-serrate, glandular teeth; nerves about 10 on each side of the midrib, irregular, the secondary nerves nearly as prominent; petiolules 1 to 1.5 cm. long. Flowers in peduncled umbels of 6 to 10 flowers each which are arranged in large racemose panicles, the peduncles about 2 cm. long in anthesis, 5 cm. long in infrutescence, whorled or alternate; pedicels 4 to 5 mm. long. Calyx cup-shaped or somewhat funnel-shaped, 2.5 to 3 mm. long, the limb slightly produced, truncate. Petals 7, lanceolate, acute, crested on the inside at the apex, about 3.5 mm. long, 1.2 mm. wide. Stamens about 28, several seriate, the inner much smaller; filaments 2 mm. long or less; anthers about 1 mm. long, the cells but slightly united. Ovary 7-celled; stigma sessile. Fruit ovoid, glabrous, about 8 mm. long, boldly 7 to 10 ridged.

PALAWAN, Casuarina Point (3809, 3844 *Curran*) March, 1906. Back of the beach and in forests along the seashore.

No species of the genus has previously been reported from the Philippines; of the 8 described species, one is from New Guinea, one from Celebes, and the remaining 6 are from the Hawaiian Islands. The species here described as new is apparently most closely related to the New Guinea species, *Tetraplasandra paucidens* Miq., but differs from the latter in many characters.

ERICACEÆ.

DIPLYCOSIA Blume.

Diplycosia scandens Merrill sp. nov.

A scandent more or less hispid pseudo-epiphytic shrub reaching a height of 4 m., with ovate or narrowly-ovate, short acuminate or acute leaves and fascicled flowers. Branches slender, gray or brown, the younger ones rather strongly beset with long brown appressed bristly hairs. Leaves coriaceous 3 to 4.5 cm. long, 1.5 to 2.5 cm. wide, the base rounded, entire, gradually narrowed above, glabrous on the upper surface or with very few hairs, beneath paler and with scattered bristly hairs; petioles about 3 mm. long, densely bristly hairy; nerves 2 on each side of the midrib, both below the middle of the leaf. Flowers axillary, 3 to 6 in each axil, the pedicels pubescent, about 4 mm. long, 2-bracteolate at the apex, the bracteoles 1 mm. long, broader than long, ciliate. Calyx teeth broad, ovate, obtuse, about 1 mm. long, ciliate. Corolla white, about 5 mm. long, 3.5 mm. in diameter, the lobes broadly ovate, acute, reflexed, nearly 2 mm. long. Stamens 10; filaments 2 mm. long, not dilated below, glabrous; anthers about 1.2 mm. long, not horned. Ovary superior, glabrous, globose, 5-celled, cells many ovuled; style about 2.2 mm. long.

LUZON, District of Lepanto, Mount Data (4597 *Merrill*) November 4, 1905. Pseudo-epiphytic on mossy tree trunks in ravines, mossy forest at about 2,250 m. The first species of the genus to be reported from the Philippines, unless *Gaultheria* (*Diplycosia*) *luzonica* A. Gray, Proc. Am. Acad. **5** (1862) 324, proves to be a true *Diplycosia*. Gray's description is so short that I have been unable to locate his species, the type being from the collections made by members of the Wilke's U. S. Exploring Expedition from "Luzon, in the Majaijai Mountains" (Mount Banajao). Dr. B. L. Robinson informs me that the type is not in the Gray Herbarium. A second, apparently closely related but glabrous species, is represented by No. 5932 *Elmer*, Province of Benguet, Luzon, the specimens with fruit only.

RHODODENDRON Linn.

Rhododendron nortoniae Merrill sp. nov.

An epiphytic shrub with lanceolate to oblong-lanceolate, coriaceous, acuminate leaves which are densely brown lepidote beneath, and terminal umbellate-like fascicles of tubular crimson flowers about 4.5 cm. long. Branches terete, brown, the branchlets densely covered with round, dark-brown scales. Leaves 9 to 15 cm. long, 1.5 to 3.5 cm. wide, narrowed below to the acute base and above to the rather long slender apex, entire, the margins slightly recurved, glabrous and shining above, densely covered with small round dark-brown scales beneath; lateral nerves 5 to 6 on each side of the midrib, distant, indistinct; petioles densely lepidote, stout, 1 cm. long or less. Umbels terminal, about 12 flowered, the bud bracts coriaceous, glabrous except the slightly pubescent margins, ovate to oblong-ovate, acute, 1 to 1.7 cm. long. Pedicels 1.3 cm. long, glabrous, the bracts oblong to spatulate, the bracteoles filiform, caducous. Calyx a disk about 3 mm. in diameter, obscurely 3-toothed, the teeth rounded, small. Corolla 4.5 cm. long, scarlet, the tube cylindrical, about 3.5 cm. long, scarcely inflated or enlarged above, slightly curved, 6 to 7 mm. in diameter, the limb 5-lobed, the lobes broadly ovate to obovate, rounded, 1 cm. long. Stamens 10; anthers oblong, 3.5 mm. long. Ovary narrowly oblong, the style elongated filiform, densely brown lepidote.

MINDANAO, Lake Lanao, Camp Keithley (500 *Mrs. Clemens*) April, 1906. Altitude about 800 m. Epiphytic on a large tree, associated with an epiphytic *Vaccinium*.

At the collector's request this distinct species is named in honor of Miss Norton, of the Pacific Grove (Calif.) Museum, the collector's interest in botanical work having been largely inspired by her.

VACCINIUM Linn.

Vaccinium microphyllum Blume. Bijdr. (1826) 851; Miq. Fl. Ind. Bat. **2** (1856) 1063.

MINDANAO, District of Davao, Mount Apo (1037, 1417 *Copeland*) April, October, 1904. A terrestrial shrub on the wind-swept summit 2,600 to 3,000 m., the shoots not ascending more than 10 cm. from the ground except in the more sheltered places.

Vaccinium microphyllum Blume, was described from a specimen in Reinwardt's herbarium from the mountains of Celebes, the original description being very short, but applying closely to the specimens cited above. A specimen of No. 1417 *Copeland* was sent to Dr. Treub, director of the Botanical Garden at Buitenzorg, Java, for verification of the above identification. Dr. Valeton, who examined the material, states that there is no authentic specimen of *Vaccinium microphyllum* in the herbarium at Buitenzorg, but that there is a sterile specimen collected by Teysmann in Ternate and identified as *V. microphyllum* by Scheffer, with which the Mount Apo plant agrees, except that the leaves of the latter are somewhat smaller than in the Ternate plant. The Mount Apo plant is apparently quite different from the species described by Beccari[19] and Clarke[20] as *Diplycosia microphylla* (Blume) Becc., and by King and Gamble[21] as *Vaccinium microphyllum* Blume, but I am of the opinion that Blume's description applies more closely to the Mount Apo plant than to the descriptions of Malayan Peninsula and Bornean material by the authors cited above. According to Valeton, the specimen reported from Celebes by Koorders[22] as *Vaccinium microphyllum* "Reinw.," is not Blume's species, the flowers being racemose in Koorders's specimens.

PRIMULACEÆ.

LYSIMACHIA Linn.

Lysimachia microphylla Merrill sp. nov. § *Lerouxia*.

A small ascending uniformly and rather strongly hirsute-pubescent annual 5 cm. high or less, with opposite, petioled, glandular-punctate, obtuse or rounded leaves and short pediceled yellow flowers. Stems slender, densely hirsute-pubescent with pale spreading hairs, simple or slightly branched from the base. Leaves opposite, orbicular-ovate to ovate, sometimes subreniform-orbicular, 5 to 7 mm. long, often nearly as wide, the apex rounded or blunt, the base subtruncate to acute, glandular punctate, uniformly hirsute-pubescent on both surfaces; petioles 1.5 to 2 mm. long, pubescent. Flowers solitary in the upper axils, the pedicels pubescent, about 2 mm. long. Calyx cleft nearly to the base, the lobes linear-lanceolate, slightly acuminate, about 3.5 mm. long, 1 mm. wide, glandular punctate, strigose pubescent outside. Corolla yellow, 3.5 mm. long, glabrous, the tube less than 1 mm. long, the lobes elliptical-ovate to elliptical-oblong, obtuse or acute, glandular punctate. Filaments 1.5

[19] *Malesia* (1878), **1**, 212.

[20] *Hook. f. Fl. Brit. Ind.* (1882), **3**, 456.

[21] *Mat. Fl. Mal. Penin.* (1905), **3**, 273.

[22] *Meded. 's Lands Plant.* (1898), **19**, 514.

mm. long; anthers blunt, 1 mm. long. Capsule 4 to 5 mm. long, ovoid, somewhat hirsute above, regularly dehiscing by 5 valves. Seeds many, triangular, rugose, brown, nearly 1 mm. long.

LUZON, Province of Benguet, Bugias (4668 *Merrill*) October 28, 1905; Daklan to Kabayan (4405 *Merrill*) October 27, 1905. On damp banks along the trail in open grass lands and in thin pine forests.

A species well characterized by its small leaves, which are glandular punctate with round spots.

SAPOTACEÆ.

SIDEROXYLON Linn.

Sideroxylon luzoniense Merrill sp. nov.

A small tree about 5 m. high with oblong-ovate to broadly oblong-lanceolate or elliptical-oblong, acuminate leaves, beneath shining and rather densely ferruginous-pubescent, and axillary fascicled flowers, the staminodes elongated, entire. Branches dark brown or nearly black, lenticellate, glabrous, the young parts rather densely cinerous and ferruginous pubescent. Leaves 7 to 9 cm. long, 2 to 4 cm. wide, coriaceous, glabrous above, the apex short acuminate or acute, gradually narrowed below to the acute base; nerves somewhat prominent beneath, 6 to 7 on each side of the midrib, the reticulations obscure; petioles densely pubescent, 1 to 1.5 cm. long. Flowers in axillary fascicles of from 2 to 5, mostly on the young branchlets, numerous, sessile. Calyx cup-shaped, 4 mm. long, densely ferruginous pubescent, 5-toothed, the teeth blunt, broad, less than 1 mm. long. Corolla 5 mm. long, glabrous, 5-lobed, lobes oblong-ovate, truncate, about 3.5 mm. long, 2 mm. wide below. Staminodes linear or linear-lanceolate, entire, blunt, 2.5 to 3 mm. long, less than 1 mm. wide. Filaments 2 mm. long; anthers broadly ovoid, 1.3 mm. long. Ovary ferruginous-pubescent, 5-celled.

LUZON, Province of Rizal, Antipolo (127 *F. W. Foxworthy*) January 16, 1906. In forest on Mount Kaysipot, at about 700 m.

OLEACEÆ.

JASMINUM Linn.

Jasminum populifolium Blume, Mus. Bot. Lugd. Bat. **1** (1850) 276; Miq. Fl. Ind. Bat. **2** (1856) 538; F.-Vill. Nov. App. (1883) 128; *J. luzoniense* Vidal, Phan. Cuming. Philip. (1885) 185; Rev. Pl. Vasc. Filip. (1886) 180; Ceron, Cat. Pl. Herb. (1892) 111; Usteri, Beitr. Ken. Philip. Veg. (1905) 120.

Blume cites no collector in the original diagnosis of his species, simply giving the locality "In insulis Philippinis." It seems probable that he had before him the same number of Cuming's plant that Vidal later described as *Jasminum luzoniense*. His description applies very closely to a specimen of No. 1029 *Cuming* in our herbarium, on which number Vidal's species was based. I have accordingly reduced *J. luzoniense* to the much earlier *J. populifolium*.

Jasminum triphyllum Merrill sp. nov. § *Trifoliata.*

A scandent shrub, glabrous or nearly so throughout, with opposite or subopposite, trifoliate leaves and axillary and terminal paniculate cymes. Branches slender, glabrous, the younger ones greenish-brown. Leaflets subcoriaceous, glabrous, ovate, slightly shining, short acuminate or merely acute, the base broad, rounded, the terminal one 6 to 9 cm. long, 3 to 4.5 cm. wide, the lateral ones somewhat smaller but similar in shape; nerves irregular, not prominent, about 6 on each side of the midrib, the base sub 5-nerved, the marginal pair often obscure; petioles 1.5 to 2 cm. long, the petiolule of the terminal leaflet 1.5 cm., of the lateral leaflets 1 cm. or less. Inflorescence equaling or exceeding the leaves, slightly pubescent, the peduncles 2 to 4 cm. long, the bracts small, ovate, the bracteoles minute. Flowers white. Calyx tube cup-shaped, about 2 mm. long, truncate or with very obscure teeth. Corolla slender, the tube 8 mm. long, slightly enlarged above, glabrous, the lobes 5, spreading, orbicular-ovate, obtuse, about 2.5 mm. in diameter. Filaments short; anthers oblong, slightly acuminate, about 2.3 mm. long. Stigma bifid, the lobes nearly 3 mm. long.

PALAWAN, Puerto Princesa (261 *Bermejos*) December, 1905. In forests.

A species apparently related to *Jasminum parviflorum* Decne., differing especially from the latter in its glabrous branches and orbicular-ovate, obtuse, not lanceolate, acuminate, corolla lobes.

GENTIANACEÆ.

COTYLANTHERA Blume.

Cotylanthera tenuis Blume. Bijd. **2** (1825) 707; Miq. Fl. Ind. Bat. **2** (1856) 735; Dunal, in DC. Prodr. **13** (1852) 674.

LUZON, Province of Laguna, Mount Maquiling (5149 *Merrill*) March 17, 1906. In forests at about 900 m.

The above identification is presumably correct, although the original and subsequent descriptions of the species, and the descriptions of *Eophylon lobbii* A. Gray, and *E. tenellum* A. Gray, the former at least being apparently a synonym of Blume's species, are all so short that absolute identification is impossible without comparison with the type material. The Philippine plant when fresh, is of a pale lavender color throughout, 4 to 6 cm. high, unbranched, or with at most one branch, with solitary flowers and 3 to 5 pairs of bracts.

GENTIANA Linn.

Gentiana apoensis Merrill sp. nov. § *Chondrophylla.*

A low, erect, often densely tufted, more or less branched perennial 2 cm. high or less, glabrous, the leaves all similar, distichous, imbricated. Leaves ovate-lanceolate, glabrous, acute or obscurely acuminate, 5 to 6 mm. long, about 2 mm. wide, sessile, crowded, the nerves obscure. Flowers solitary at the ends of the short branches. Calyx 5 mm. long including the teeth, the latter lanceolate, acuminate, apiculate, 2 to 2.5 mm. long. Corolla tubular, about 7 mm. long, 5-lobed, the lobes broadly ovate, acute or obscurely acuminate, about 1.5 mm. long, the tube plaited, the teeth of the folds rounded or obtuse, entire or nearly so. Filaments 2 mm. long; anthers 0.9 mm. long. Capsule slightly exserted, stalked, the stalk about 5 mm. long, the capsule broadly ovoid, compressed, about 4 mm. long, the valves rather strongly 3-nerved.

MINDANAO, District of Davao, Mount Apo (1161, 1432 *Copeland*) April, October, 1904; (371 *DeVore & Hoover*) May, 1903. "Occasional in turf, but inconspicuous, not common," *Copeland*. Summit of the mountain at about 3,000 m.

No species of this genus have previously been reported from the Philippines.

Gentiana diversifolia Merrill sp. nov. § *Chondrophylla.*

An erect annual 2 to 3 cm. high or less, fasciculately branched, the stems glabrous, single. Lower leaves orbicular-ovate to orbicular-obovate, 10 to 12 mm. long, 10 mm. wide, acute, apiculate, narrowed below, glabrous, the margins very minutely denticulate, the leaves of the branches narrowly lanceolate, acuminate, apiculate, 6 to 8 mm. long, about 2 mm. wide, hyaline margined, the margins ciliate. Branches with one or two flowers. Calyx including the teeth about 6 mm. long, the teeth narrowly lanceolate, acuminate, apiculate, the margins ciliate, about 3 mm. long. Corolla tubular 7 to 8 mm. long, the teeth 5, narrowly ovate, blunt, their margins incurved, 2 mm. long or less, the tube plaited between the teeth, the teeth of the folds less than 1 mm. long, narrowly ovate, entire, acute. Filaments about 1.5 mm. long; anthers 1 mm. long. Capsule stalked, slightly exserted, the stalk broad, about 5 mm. long, the capsule about 4 mm. long, orbicular-ovate, margined, compressed, obtuse. Seed subglobose to ovoid, brown, minute, about 0.2 mm. in diameter.

LUZON, Province of Benguet, Kabayan (4443 *Merrill*) October 27, 1905. On damp, rocky banks, in open lands. Rare, altitude about 1,300 m.

Gentiana luzoniensis Merrill sp. nov. § *Chondrophylla.*

An erect simple or slightly branched annual 3 cm. high or less, the leaves similar, not imbricated, the stem and branches glandular. Leaves sessile, elliptical-ovate, acute or obtuse, glabrous, 6 mm. long or less, 3.5 mm. wide or less, the nerves few, obscure. Flowers white, solitary at the ends of the branches. Calyx about 4.5 mm. long including the teeth, the teeth lanceolate, acuminate, about 1.5 mm. long. Corolla 8 mm. long, tubular-campanulate, 5-lobed, the lobes ovate, acuminate, 1.5 to 2 mm. long, the tube plaited between the lobes, the teeth of the folds ovate, often slightly toothed, 1 mm. long or less. Filaments 4 mm. long; anthers 0.8 mm. long. Stigmas 1 to 1.5 mm. long, recurved. Capsule slightly exserted, stalked, narrowly obovoid, compressed, margined, about 5 mm. long. Seeds narrowly ovoid, acute, minutely reticulate, about 0.5 mm. long.

LUZON, District of Lepanto, Mount Data (4558 *Merrill*) November 4, 1905. On dry, open, grassy slopes in thin pine forests at about 2,100 m., rare.

GESNERIACEÆ.

CYRTANDRA Forst.

Cyrtandra villosissima Merrill sp. nov.

A shrub very densely ferruginous villous throughout with long soft hairs, the pubescence felted on the younger branches, inflorescence, petioles and under surface of the leaves. Branches brown, terete, the older ones less densely villous than the ultimate branches. Leaves thick, oblong-ovate to ovate-lanceolate, 11 to 20 cm. long, 3.5 to 8 cm. wide, narrowed above to the rather slender acuminate apex, and below to the acute or acuminate strongly inequilateral base, densely softly ferruginous villous throughout, paler beneath, the upper surface less densely pubescent than the lower, the margins dentate above, densely ciliate villous; nerves 12 to 14 on each side of the midrib; petioles densely felted villous, 4 cm. long or less. Cymes axillary, several flowered, about 3 cm. long, the bracts linear, 1 cm. long or less, densely felted villous like the rest of the inflorescence. Calyx lobes linear, 1.5 cm. long, 1 mm. wide, persistent, densely villous. Corolla about 18 mm. long, somewhat hirsute outside, tubular, subequally 5-lobed, the lobes orbicular-ovate, about 4 mm. long, pilose outside. Stamens 2, inserted at about the middle of the tube, included; filaments about 2 mm. long; anthers 2.5 mm. Ovary oblong, densely pilose; style pilose, included, 2-cleft; stigmas broadly elliptical-ovate. Disk cup-shaped, glabrous, 1 mm. long. Capsule oblong, about 1 cm. long, 4.5 mm. thick, hirsute. Seeds indefinite, oblong, about 0.3 mm. long, glabrous, brown.

MINDANAO, Lake Lanao, Camp Keithley (51 *Mrs. Clemens*) January, 1906. A very characteristic species, recognizable by its very dense, felted, ferruginous soft, villous pubescence, perhaps most closely related to *Cyrtandra mollis* DeVriese.

MONOPHYLLEA R. Br.

Monophyllea lowei C. B. Clarke in DC. Monog. Phan. 5 (1883) 183.

MINDANAO, District of Zamboanga, San Ramon (1565 *Copeland*) December 11, 1904. In rocky gorges in forests at about 160 m.

No species of this Malayan genus has previously been reported from the Philippines, the above specimens differing from *Monophyllea lowei* in its somewhat smaller leaves, but I am unable to separate it by other characters, the original description of Clarke's species being rather short. Borneo.

PARABOEA Ridl.

Paraboea luzoniensis Merrill sp. nov.

Stems stout, 5 to 7 cm. long, somewhat floccose, gray. Leaves many, crowded, long petioled, elliptical-ovate to elliptical-obovate, membranous, 7 to 11 cm. long, 4 to 7 cm. wide, subentire, the apex broad, rounded, rarely somewhat acute, the base acute or subtruncate, often oblique, the upper surface glabrous or nearly so, the lower surface paler, more or less densely floccose pubescent; nerves 6 to 8 on each side of the midrib, ascending; petioles 2 to 7 cm. long, somewhat pubescent. Cymes many, axillary, long peduncled, lax, glabrous, the peduncles 12 cm. long or less, slender, dichotomously branched above, the bracts and bracteoles linear to lanceolate, 5 mm. long or less, the pedicels slender, 1 cm. long or less. Flowers pale blue, 1.5 cm. in diameter. Calyx 5-cleft nearly to the base, the lobes linear, 3 to 3.5 mm. long, less than 1 mm. wide, glabrous. Corolla 5-lobed, the lobes ovate, rounded, about 4 mm. long, the tube short, broad. Stamens 2; filaments 4 mm. long; anthers 2 mm. long, much broader than long. Ovary glabrous; style subcapitate. Capsule glabrous, linear, 2 to 2.5 cm. long, dehiscing into 4 straight valves. Seeds numerous, narrow, acute, brown, 0.4 mm. long.

LUZON, Province of Cavite, Maragondong (4178 *Merrill*) July 30, 1905. Abundant locally on cliffs in ravines 100 to 400 m.

I have followed Ridley[23] in retaining *Paraboca* as a genus distinct from *Didymocarpus* Clarke (*Roettlera* Vahl.).

TRICHOSPORUM Don.

Trichosporum littorale Merrill sp. nov.

A scandent epiphyte, glabrous except the slightly pubescent branches and inflorescence, with opposite, orbicular-ovate to elliptical-ovate leaves, 3 cm. long or less, and terminal flowers about 5 cm. long. Branches gray, slender, terete, somewhat pubescent. Leaves coriaceous, 2 to 3 cm. long, 1.5 to 2.5 cm. wide, entire, the base broad, rounded or slightly cordate, the apex acute or obtuse; nerves obsolete; petioles slightly pubescent, about 2 mm. long. Flowers purplish, several at the end of each branchlet, the pedicels 1.5 to 2 cm. long, slightly pubescent. Calyx nearly 3 cm. long, cylindrical, somewhat inflated, glabrous or slightly ciliate at the apex, 5-toothed, the teeth ovate, acute or obtuse, about 3 mm. long. Corolla about 5 cm. long, inflated at the base, then narrowed, and inflated again above. Capsule unknown.

MINDANAO, District of Davao, Malita (647 *Copeland*) March 26, 1904. Growing on tree trunks over the beach along the seashore, characterized by its short, broad, somewhat cordate leaves and relatively large calyx.

Trichosporum ovatum Merrill sp. nov.

A scandent plant, apparently an epiphyte, with opposite, glabrous, fleshy, coriaceous, ovate, acute leaves 3 cm. long or less, the flowers fascicled at the apices of the branches, 3 to 3.5 cm. long. Branches slender, gray, somewhat pubescent with weak scattered hairs, emitting rootlets. Leaves opposite, 1.5 to 3 cm. long, 1.5 to 2 cm. wide, very thick, fleshy when fresh, acute, the base broad, rounded, entire, the nerves obsolete; petioles about 2 mm. long, slightly ciliate. Flowers fascicled, 5 or 6 at the end of each branchlet, the pedicels, calyx, and corolla uniformly hirsute outside with scattered hairs, the pedicels slender, about 7 mm. long. Calyx glabrous inside, cylindrical, 1 cm. long, subequally 5-toothed, the teeth short, broad, obtuse, 1.5 mm. long or less. Corolla apparently purple, tubular, curved, slightly inflated above, contracted somewhat at the throat, about 3 cm. long, the lobes ovate, rounded, 5 to 6 mm. long. Stamens 4, slightly exserted, the anthers 2.5 mm. long. Ovary glabrous; style slightly pubescent below the stigma. Fruit unknown.

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[23] *Journ. Straits Branch R. A. Soc.* (1905), **43**, 63.

MINDANAO, Lake Lanao, Camp Keithley (316 *Mrs. Clemens*) February, 1906. Altitude about 800 m. A species probably of the section *Holocalyx*.

Trichosporum copelandi Merrill sp. nov.

A scandent epiphyte, glabrous except the inflorescence, with opposite, oblong leaves 5 to 7 cm. in length, and axillary and terminal inflorescence, the flowers quite the same as in *Trichosporum ovatum*. Branches slender, gray, glabrous. Leaves coriaceous, 1.5 to 2.5 cm. long, the base rounded or obtuse, the apex acute, pale, somewhat shining, the nerves obsolete; petioles rugose, 4 to 5 mm. long. Peduncles axillary and terminal, solitary or fascicled, somewhat pilose, two or more flowered. Flowers purple, in size, shape, and pubescence quite the same as in *Trichosporum ovatum*. Capsules linear, 10 cm. long. Seeds wanting.

MINDANAO, District of Zamboanga, San Ramon (1619 *Copeland*) February 5, 1905. An epiphytic vine in forests along the river at about 200 m. A species apparently closely related to the preceding, similar in floral characters, but differing in its much larger, very differently shaped leaves, longer petioles, and glabrous branches, the inflorescence being also lateral as well as terminal.

Trichosporum rubrum Merrill sp. nov.

A scandent epiphyte reaching a length of from 4 to 6 m., rather strongly hirsute pilose with pale often appressed hairs, the leaves lanceolate to oblanceolate, the flowers red. Branches gray, the older ones glabrous, the younger branchlets densely appressed hirsute-pilose. Leaves subcoriaceous, 4 to 8 cm. long, 1.5 to 2 cm. wide, pale beneath, the upper surface rather densely appressed hirsute-pilose, the lower surface densely so on the midrib and nerves, gradually narrowed below to the slender acute base, more abruptly narrowed above to the acute apex, the margins entire, hirsute; nerves about 4 on each side of the midrib, ascending; petioles 1 to 4 cm. long, densely appressed hirsute. Flowers fascicled in the upper axils, the pedicels hirsute, 2 cm. long or less. Calyx hirsute, deeply 5-cleft nearly to the base, the lobes linear, about 6 mm. long, 1.5 mm. wide, blunt. Corolla nearly 3 cm. long, bright red, tubular, slightly curved, densely uniformly hirsute pilose with pale 2 mm. long hairs, the lobes elliptical-ovate, rounded, 4 to 5 mm. long. Filaments glabrous; anthers broad, 2 mm. long. Disk truncate or obscurely toothed, glabrous, cup-shaped, 2 mm. long. Ovary glabrous. Old capsules pale, glabrous, linear, 8 cm. long, the seeds not seen.

LUZON, District of Lepanto, Mount Data (4581 *Merrill*) November 4, 1905. On mossy tree trunks in ravines at about 2,200 m.

HYDROPHYLLACEÆ.

ELLISIOPHYLLUM Maxim.

Ellisiophyllum reptans Maxim. Bull. Acad. Pétersb. **16** (1871) 223.

LUZON, Province of Benguet, Pauai (4738 *Merrill*) November 8, 1905. In the mossy forest at about 2,200 m. Japan.

This monotypic genus has previously been known only from Japan, and the discovery of the species in the Philippines is of special interest, especially in connection with the now known, strong, northern floristic element in the highlands of Northern Luzon. The identification has been made from the generic descriptions in Bentham and Hooker, Genera Plantarum, and in Engler und Prantl, Natürlichen Pflanzenfamilien, as the original description of the genus and species is not available in Manila.

BORRAGINACEÆ.

BOTHRIOSPERMUM Bunge.

Bothriospermum tenellum (Hornem.) Fisch. & Mey. Ind. Sem. (1835) 24; Clarke in Hook. f. Fl. Brit. Ind. **4** (1883) 167. *Anchusia tenella* Hornem. Hort. Hafn. **1** (1813–1815) 176.

LUZON, Province of Benguet, Baguio (5774 *Elmer*) March, 1904. In waste places about old rice lands. An interesting addition to our knowledge of the northern element in the Philippine flora, Northern India to Manchuria, China, Formosa, and Japan.

TRIGONOTIS Stev.

Trigonotis philippinensis Merrill sp. nov.

An erect or somewhat spreading few branched herb 25 cm. high or less, with oblong-elliptical short acuminate or apiculate leaves, white flowers in terminal ebracteolate racemes, and glabrous tetrahedral shining nutlets. Branches more or less appressed hispid pubescent. Leaves coriaceous, 1 to 1.8 cm. long, 8 mm. wide or less, appressed hispid pubescent on both surfaces with scattered white hairs, the petioles 1 cm. long or less, the nerves obsolete. Racemes terminal, solitary, about 10 cm. long, appressed hispid pubescent, ebracteolate, the pedicels short, elongated to 5 or 6 mm. in fruit. Calyx nearly 3 mm. long, 5-cleft, the lobes narrowly ovate, acute, hispid, nearly 2 mm. long. Corolla white, 4 mm. long, the tube nearly 2 mm. long, the 5 lobes spreading, broadly obovate, rounded, the throat with 5 rather broad scales. Stamens 5, included, the filaments very short, the anthers oblong, about 0.8 mm. long. Ovary glabrous; style simple, slender, about 1 mm. long. Carpels 4, with 4 acute edges, black, glabrous, shining, about 1 mm. long, the scar small, basal.

LUZON, Province of Benguet, Pauai to Baguio (4700 *Merrill*) November 9, 1905. Growing on damp mossy cliffs just below the limits of the mossy forest at an altitude of about 1,900 m., rare.

An interesting addition to our knowledge of the northern element in the Philippine flora, no species of the genus having previously been reported from the Philippines, all which had been known being confined to the Asiatic continent, Japan, and the Luchu Archipelago.

VERBENACEÆ.

PREMNA Linn.

In F.-Villar's Novissima Appendix to the third edition of Blanco's Flora de Filipinas, 11 species of *Premna* are enumerated. Of these eleven species, but two are here enumerated under the same names as those used by F.-Villar, *Premna adenosticta* Schauer and *P. cumingiana* Schauer. From synonomy and other sources I have been able satisfactorily to reduce five species, *P. foetida* F.-Vill., non Reinw.; *P. pubescens* F.-Vill., non Blume; *P. vestita* Schauer; *P. tomentosa* F.-Vill., non Willd., and *P. mucronata* F.-Vill., non Roxb., while judging from the native names cited the species enumerated as *Premna viburnoides* Wall., is *P. nauseosa* Blanco. *Premna philippinensis* Turcz, is a species of *Vitex*, *V. turczaninowii* Merr.[24] *Premna gaudichaudii* Schauer is enumerated by F.-Villar, but is not credited to the Philippines, this with *P. mariannarum,* the remaining species of Villar's list, should be excluded from the Philippine flora, unless at some future time material is collected that agrees with the descriptions of these species.

1. Calyx equally or subequally 4-toothed.
2. A tree; leaves long acuminate, pale; corymbs densely stellate pubescent .... (1) *P. adenosticta*
2. Scandent shrubs; leaves acute or short acuminate, dark when dry; corymbs glabrous or pubescent, never stellate pubescent.
3. Leaves broadly elliptical-ovate, 10 to 20 cm. long; inflorescence 12 to 14 cm. in diameter, crisped pubescent .... (2) *P. membranacea*
3. Leaves oblong, 5 to 9 cm. long; inflorescence 4 to 6 cm. in diameter, ferruginous pubescent, the pubescence not stellate or crisped .... (3) *P. oblongifolia*
1. Calyx subequally 5-toothed, or bilabiate, one lip entire and the other 2-toothed, or one lip 2-toothed and the other 3-toothed.
2. Leaves ample, rufous or ferruginous stellate pubescent.......... (4) *P. cumingiana*
2. Leaves glabrous or pubescent, never stellate pubescent.
3. Scandent; leaves pubescent beneath.......... (5) *P. subscandens*
3. Erect trees or shrubs.
4. Leaves uniformly and usually densely pubescent beneath.
5. Leaves 6 cm. long or less; petioles 5 mm. long or less.......... (6) *P. depauperata*
5. Leaves 10 to 20 cm. long; petioles 2 to 6 cm. long .... (7) *P. odorata*
4. Leaves glabrous, or if pubescent only so on the nerves and midrib.
5. Leaves 6 to 9 cm. long.
6. Leaves coriaceous; inflorescence dense (8) *P. congesta*
6. Leaves membranous; inflorescence rather lax .... (9) *P. nauseosa*
5. Leaves 9 to 18 cm. long; inflorescence more or less lax.
6. Leaves usually oblong or oblong-ovate, acute or obtuse; nerves 4 to 5, glabrous, or at least pubescent only in the axils beneath.......... (10) *P. integrifolia*

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[24] *Govt. Lab. Publ.* (1906), **35**, 77.

6. Leaves ovate, acuminate; nerves 5 to 6, pubescent on both surfaces; corolla 3 mm. long.................................(11) *P. nitida*

6. Leaves usually broadly ovate, acuminate; nerves 6 to 7, glabrous, or pubescent on the upper surface or on both; corolla 5.5 to 6 mm. long..(12) *P. subglabra*

(1) **Premna adenosticta** Schauer in DC. Prodr. **11** (1847) 630; Miq. Fl. Ind. Bat. **2** (1856) 892; F.-Vill. Nov. App. (1883) 159; Vid. Phan. Cuming. Philip. (1885) 134; Rev. Pl. Vasc. Filip. (1886) 209; Ceron Cat. Pl. Herb. (1892) 131.

PHILIPPINES (1230 *Cuming*) 1836–1840, cotype. LUZON, Province of Rizal, Bosoboso (2863 *Ahern's collector*) March, 1905; San Mateo (1122 *Ahern's collector*) May, 1904; Antipolo (435 *Ahern's collector*) February, 1904; Province of Camarines, Pasacao (103 *Ahern*) March, 1902. Endemic.

(2) **Premna membranacea** Merr. Govt. Lab. Publ. **35** (1906) 65.

LUZON, Province of Rizal, Bosoboso (1165, 3102 *Ahern's collector*) June, 1904, June, 1905. T., *Alamag*. Endemic.

(3) **Premna oblongifolia** Merr. l. c. **29** (1905) 48.

LUZON, Province of Benguet, Baguio (5990 *Elmer*) March, 1904; Province of Tayabas (Infanta) (816 *Whitford*) September, 1904. Endemic.

(4) **Premna cumingiana** Schauer in DC. Prodr. **11** (1847) 634; Vidal, Cat. Pl. Prov. Manila (1880) 39; Rev. Pl. Vasc. Filip. (1886) 209; Phan. Cuming. Philip. (1885) 134; F.-Vill. Nov. App. (1883) 159; Miq. Fl. Ind. Bat. **2** (1856) 778; Koorders Meded. 's Lands Plantent. **19** (1898) 559. *Premna cordata* Blanco, Fl. Filip. ed. 1 (1837) 489, non R. Br. *Premna tomentosa* Blanco, l. c., ed. 2 (1845) 342; ed. 3, **2** (1878) 269; F.-Vill. Nov. App. (1883) 159, non Willd. *Premna cardiophylla* Schauer, l. c. 638; Miq. Fl. Ind. Bat. **2** (1856) 900.

PHILIPPINES (778, 1280 *Cuming*) 1836–1840, cotypes. LUZON, Province of Rizal, San Mateo (1850 *Ahern's collector*) September, 1904; (112 *Merrill*) Decades Philip. Forest. Fl., coll. *Ahern's collector*, May, 1904, distributed as *Geunsia cumingiana*; Bosoboso (2676 *Merrill*) June, 1903; (3133 *Ahern's collector*) June, 1905; Province of Camarines, Pasacao (803 *Ahern*) 1902. MINDANAO, District of Davao (689 *Ahern*) June, 1901; (109 *DeVore & Hoover*) April, 1903.

A species known only from the Philippines and Celebes. *Premna cordata* Blanco, non R. Br.=*Premna tomentosa* Blanco, non Willd., although very imperfectly described by Blanco, is certainly referable to Schauer's species. Blanco's short description applies well to the specimens above cited, especially his expression "El involucro *universal* de la umbela, el de la *parcial* y el de la florecita, dos hojuelas alesnadas," by "involucro" Blanco meaning the bracts and bracteoles. *Premna cardiophylla* Schauer, is only a new name for Blanco's *Premna cordata*, and is included by the former in his monograph under doubtful or not sufficiently known species. T., *Maguilac;* according to Blanco, *Malaapi*.

(5) **Premna subscandens** Merrill sp. nov.

A scandent shrub, the leaves, branchlets, and inflorescence more or less pubescent, with subequally 5-toothed or obscurely 2-lipped calyces, the corollas 4-lobed. Branches light gray or brown, glabrous, obscurely angled, the lenticels few, the younger branchlets pubescent, sometimes densely so. Leaves ovate, membranous, 6 to 10 cm. long, 3 to 7 cm.

wide, entire or distantly obscurely toothed above, acuminate, the base broad, rounded or cordate, sometimes acute, thinly pubescent on both surfaces, more densely so beneath, often densely pubescent on the nerves and midrib, except the latter sometimes becoming glabrous or nearly so, shining, usually dark colored when dry; nerves 5 on each side of the midrib, somewhat prominent, the reticulations somewhat lax; petioles 1 to 4 cm. long, pubescent. Cymes terminating the branches and short lateral branchlets, many flowered, somewhat dense, 5 to 14 cm. across, all parts except the corollas uniformly densely softly grayish brown pubescent, the linear bracts 5 to 7 mm. long, densely pubescent, the bracteoles similar but much smaller. Flowers white or greenish, fragrant. Calyx densely softly pubescent, cup-shaped, 3 mm. long, 5-toothed, the teeth subequal, rounded or acute, 1 mm. long or less, or sometimes obscurely 2-lipped, one lip 2-toothed, the other 3-toothed. Corolla 5 mm. long, glabrous outside, villous within, 2 lipped, one lip ovate, entire, nearly 2 mm. long, the other coarsely 3-lobed, the lobes nearly equaling the entire lip. Stamens 4, didynamous; filaments 4 to 5 mm. long, villous below; anthers about 0.4 mm. long. Ovary glabrous; style 5.5 mm. long.

LUZON, Province of Rizal, Antipolo (449, 443 *Ahern's collector*) April, 1904; Bosoboso (1874 *Merrill*) April, 1903. TICAO (1095 *Clark*) May, 1904. T., *Alagbaguin, Alagao-baguin*. V., *Uradgao*.

(6) **Premna depauperata** Merrill sp. nov.

An undershrub, 1 m. high or less, with short petioled, coriaceous oblong-ovate to elliptical-ovate, small leaves, densely ferruginous pubescent inflorescence and 5-toothed calyx. Branches terete, light brown, mostly densely ferruginous pubescent, lenticellate. Leaves 3 to 6 cm. long, 2 to 3.5 cm. wide, shining above, entire, the margins recurved, acute, the base broad, rounded-cordate, the upper surface sparingly strigose pubescent, the lower surface somewhat densely pubescent, glandular; nerves 4 to 5 on each side of the midrib, distinct beneath, anastomosing; petioles densely pubescent, 5 mm. long or less. Corymbs terminal, 4 to 5 cm. long, nearly as wide, densely ferruginous pubescent throughout, densely flowered, the lower bracts small, foliaceous, the upper and bracteoles linear. Calyx cup-shaped, nearly 3 mm. long, sparingly strigose pubescent, subequally 5-toothed, or obscurely 2-lipped with one 2-toothed and one 3-toothed lip. Corolla 4 mm. long, pubescent outside, villous on the throat within, 4-lobed, one lobe lip-like, exceeding the others. Stamens not exceeding the corolla lobes; anthers 0.5 mm. long; filaments glabrous. Ovary glabrous, ovoid or globose; style 3.5 mm. long. Fruit glabrous, ovoid, about 4 mm. long.

CULION (603 *Merrill*) December, 1902. On dry open grassy hillsides 30 to 40 m. above the sea. A species well characterized by its small size, small leaves, which are cordate at the base, and short petioles.

(7) **Premna odorata** Blanco Fl. Filip. ed. 1 (1837) 489; ed. 2 (1845) 341; ed. 3, **2** (1878) 268; Schauer in DC. Prodr. **11** (1847) 638; Miq. Fl. Ind. Bat. **2** (1856) 900; Merr. Govt. Lab. Publ. **27** (1905) 68; l. c. **35** (1906) 76. *Premna vestita* Schauer, l. c. 631; Miq. l. c. 892; F.-Vill. Nov. App. (1883) 159; Vidal, Phan. Cuming. Philip. (1885) 134; Rev. Pl. Vasc. Filip. (1886) 209; Sinopsis, Atlas (1883) *t. 74. f. E.;* Merr. Forest. Bur. Bull. **1** (1903) 51. *Premna serratifolia* Blanco l. c. ed. 2 (1845) 269; ed. 3, l. c. *Premna tomentosa* F.-Vill. l. c. ex syn. Blanco, non Blume. *Premna foetida* F.-Vill., l. c. non Reinw., ex syn. Blanco.

PHILIPPINES (599 *Cuming*) 1836–1840, cotype of *Premna vestita* Schauer. LUZON, Manila (22, 3421 *Merrill*) April, 1902; November, 1903; (718 *Ahern*) April, 1901: Province of Bataan, Dinalupihan (1514 *Merrill*) January, 1903; Lamao River (2590 *Meyer*) February, 1905; Mariveles (748, 780 *Ahern*) January, 1902: Province of Pampanga (37 *Parker*) May, 1904: Province of Rizal, Antipolo (24 *Merrill*) Decades Philip. Forest Fl., coll. *Ahern's collector*, February, 1904: Province of Tayabas, Lucena (2892 *Merrill*) June, 1903: Province of Union, Bauang (5561 *Elmer*) February, 1904: Province of Benguet, Sablan (6154 *Elmer*) April, 1904. MINDORO, Baco (1218 *Merrill*) January, 1903. GUIMARAS (235 *Gammill*) January, 1904.

Premna vestita is placed by Schauer in the section with 4-toothed calyces, but in two specimens of *Cuming's* No. 599 in our herbarium, on which number the species was based, the calyces are distinctly 5-toothed. This is certainly the most abundant and widely distributed species of the genus in the Philippines, and is the one utilized by the natives as noted by Blanco. Blanco's description applies very closely, and I am of the opinion that there can be no doubt as to the correctness of the identification. *Premna serratifolia* Blanco is reduced to *P. odorata*, as Blanco states that the species can be distinguished from the latter only by the serrate leaves. Nos. 1218 and 3421 *Merrill* and No. 37 *Parker* show this character, but no other characters on which I am able to separate this form as a distinct species. As a result of the reduction of *Premna serratifolia* to *P. odorata*, I have also so reduced *P. foetida* F.-Vill., to which F.-Villar referred *P. serratifolia* Blanco. For the same reason F.-Villar's *Premna pubescens* is reduced, he having referred *Premna odorata* Blanco to Blume's species. From F.-Villar's remark, however, it is possible that he referred specimens of *Premna cumingiana* to *Premna pubescens.* Abundant and widely distributed in the Philippines. T., *Alagao.* V., *Adgao.*

(8) **Premna congesta** Merrill sp. nov.

A shub or small tree with small ovate to elliptical-ovate nearly glabrous leaves 2.5 to 7 cm. long, and densely flowered terminal cymes 3 to 5 cm. in diameter, the calyx 2-lipped, the corolla 4-lobed. Branches terete lenticellate, light gray or brownish, becoming quite glabrous, the younger parts with few scattered, weak hairs. Leaves subcoriaceous, 1.5 to 4.5 cm. wide, shining and glabrous above, or the nerves somewhat pubescent, paler beneath and minutely punctulate, glabrous, or the axils of the nerves barbellate, and sometimes the midrib somewhat pubescent, entire or somewhat crenate above, acute or obtuse, rarely very short acuminate, the base rounded; nerves about 4 on each side of the midrib, somewhat prominent; petioles slender, 1 cm. long or less, somewhat pubescent. Cymes pubescent with few weak, scattered hairs, the branches spreading or ascending, the bracts and bracteoles linear to lanceolate, 1.5 to 3 mm.

long, somewhat pubescent, the short pediceled flowers subtended by about 3 linear bracteoles. Calyx glabrous, cup-shaped, 2 mm. long, 2-lipped, one lip coarsely 2-toothed, the other truncate, subentire or minutely 2 to 3 toothed. Corolla 4 to 4.5 mm. long, tubular, 4-lobed, three lobes equal, ovate, about 1.5 mm. long, obtuse, the fourth somewhat larger, glabrous outside, villous within. Stamens 4, didynamous; anthers about 0.5 mm. long. Ovary glabrous; style slender, nearly 4 mm. long.

LUZON, Province of Rizal, Bosoboso (3281 *Ahern's collector*) August 6, 1905. T., *Alacaas*. According to the native collector, the flowers are reddish in color.

(9) **Premna nauseosa** Blanco Fl. Filip. ed. 1 (1837) 489; Schauer in DC. Prodr. 11 (1847) 638; Miq. Fl. Ind. Bat. **2** (1856) 900; Vidal, Phan. Cuming. Philip. (1885) 134; Rev. Pl. Vasc. Filip. (1886) 209; Merrill, Govt. Lab. Publ. **27** (1905) 68. *Premna mucronata* F.-Vill. Nov. App. (1883) 159; Schauer, l. c. 635, in part; Miq. Fl. Ind. Bat. **2** (1856) 897, in part, with reference to No. 1367 *Cuming*. *Premna leucostoma* Naves, Fl. Filip. ed. 3, *pl. 346*, non Miq.

PHILIPPINES (1367 *Cuming*) 1836-1840, in Herb. Bureau of Science. LUZON, Province of Zambales, Subic (2191, 2915 *Merrill*) May, 1903: Province of Bataan, Mount Mariveles (387 *Whitford*) June; (6841 *Elmer*) November; (769, 1271, 1275, 1613 *Borden*) May to August, 1904: Province of Tarlac (705 *Ahern*) May, 1901: Province of Rizal, Antipolo (24 *Guerrero*) June, 1903; (1682 *Merrill*) March, 1903.

A species widely distributed in Luzon, usually somewhat pubescent, in which character Blanco's short and imperfect description does not apply. It is, however, the only species at present known to me that has a somewhat disagreeable odor, the character on which Blanco's specific name was based. This species is enumerated by Schauer as doubtful, or not sufficiently known. According to Vidal, Nos. 693 and 1353 *Cuming* also represent it, and it is possible that No. 1451 *Cuming* is also the same, a fragment of the latter number existing in our herbarium. From the native names cited, *Premna viburnoides* Vidal, Cat. Pl. Prov. Manila (1880) 134; F.-Vill. Nov. App. (1883) 159, non Wall., should be referred to this species, *Premna nauseosa* being quite universally known to the Tagalogs as *Molauain aso*, literally "dog molave." *Molauain* or *Molave* being the Tagalog name for the valuable timber trees of the genus *Vitex*, the timber of *Premna nauseosa* being considerably utilized for certain constructions, and somewhat resembling *Molave*.

(10) **Premna integrifolia** Linn. Mant. (1767) 252; Clarke in Hook. f. Fl. Brit. Ind. **4** (1885) 574; Forbes & Hemsl. Journ. Linn. Soc. Bot. **26** (1890) 255; Schum. und Lauterb. Fl. Deutsch. Schutz. Südsee (1901) 523.

LUZON, Province of Camarines, Pasacao (141, 138, 801 *Ahern*) 1902: Province of Tayabas (Infanta) (760 *Whitford*) September, 1904: Province of Zambales, Subic (2199 *Merrill*) May, 1903: Province of Principe, Baler (1083 *Merrill*) October, 1902: Province of Bataan, Lamao River (2043 *Borden*) October, 1904. MINDORO, Calapan (899 *Merrill*) April, 1903; Baco (1173 *Merrill*) January. Apo Island, Mindoro Strait (427 *Merrill*) December, 1902. MINDANAO, District of Davao (350 *Copeland*) March, 1904; (138, 226 *DeVore & Hoover*) April, 1903.

A species apparently confined to the seashore or near it, widely distributed in the Philippines. Tropical Asia to Malaya, New Guinea and Polynesia. T., *Alagao, Alagao dagat*. (*Dagat* in Tagalog=ocean).

(11) **Premna nitida** K. Sch. Fl. Kaiser Wilhelms Land (1889) 120; Sch. und Lauterb. Fl. Deutsch Schutz. Südsee (1901) 523; Usteri, Beitr. Kennt. Philip. Veg. (1905) 123.

This species is reported from Negros and Panay by Usteri, but I have seen no Philippine specimens to which Schumann's description applies. The species is known from New Guinea and doubtfully from Celebes.

(12) **Premna subglabra** Merrill sp. nov.

A tree 7 to 12 m. high, becoming nearly glabrous, the slightly pubescent calyces obscurely 2-lipped, one lip entire or very obscurely 2 to 3 toothed, the other 2-toothed. Branches light gray or brown, glabrous, terete, the branchlets reddish brown, obscurely angled, deciduously short-pubescent, becoming glabrous or nearly so. Leaves ovate to oblong-ovate, chartaceous, entire, short acuminate, the base broad, rounded, subtruncate to somewhat cordate, or sometimes acute, shining, glabrous above except the somewhat pubescent midrib and nerves, paler beneath, obscurely minutely glandular punctate, glabrous, or the nerves and midrib very slightly pubescent, the axils sometimes barbellate; nerves prominent beneath, ascending, 6 to 7 on each side of the midrib, the reticulations distinct; petioles 2 to 7 cm. long, usually pubescent on the upper surface, otherwise glabrous. Corymbs terminal, spreading, many flowered, 9 to 14 cm. long, 10 to 20 cm. wide, more or less ferruginous pubescent throughout, the ultimate branchlets rather densely so, the bracts linear, 5 to 8 mm. long, the bracteoles similar but much smaller. Flowers greenish. Calyx slightly pubescent, becoming glabrous, cup-shaped, 2 mm. long. Corolla 5.5 to 6 mm. long, glabrous outside, villous within, 2-lipped, one lip short, entire or retuse, the other 3-lobed, the middle lobe much exceeding the lateral ones. Stamens slightly exceeding the corolla lobes; filaments villous below; anthers about 0.6 mm. long. Ovary glabrous; style 4 to 5 mm. long. Fruit globose, dark purple when mature, glabrous, about 3 mm. in diameter.

LUZON, Province of Tayabas, Atimonan (670, 671 *Whitford*) August 19, 1904. MINDORO, Pinamalayan (2165 *Merrill*) May, 1903; Pola (2243 *Merrill*) May, 1903. In forests along streams below 100 m. T., *Alagao*.

LABIATÆ.

COLEUS Lour.

Coleus macranthus Merrill sp. nov. § *Solenostemonoides*.

An erect branched herb 1 to 2 m. high, more or less glandular ferruginous puberulent, with long petioled, ovate to oblong-ovate, rather strongly dentate leaves, narrow many flowered panicles, the flowers pure white to purple, often 2 cm. long. Branches brown when dry, densely glandular puberulent to nearly glabrous. Leaves membranous, 4 to 15 cm. long, 3 to 7 cm. wide, the base often broad and subtruncate, sometimes acute, decurrent, the apex short acuminate, the margins entire near the base, above prominently and regularly dentate, dull, the nerves and midrib on both surfaces usually puberulent, paler beneath and with numerous small punctate glands; nerves about 10 on each side of the midrib, prominent; petioles 2 to 7 cm. long. Panicles narrow, 15 to 25 cm. long, the branches verticillate, spreading, branched, glandular puberulent, 2 cm. long or less; bracts deciduous, ovate, acuminate, 7 to 8 mm. long. Calyx glabrous within, glandular puberulent outside, in fruit about 10 mm. long, the upper lip broadly ovate, acute or slightly acuminate, flat, about 4 mm. long, the lateral teeth ovate to elliptical, rounded, about 2.5 mm. long, the lower lobe oblong, 7 mm. long, 2 toothed, the teeth lanceolate or linear lanceolate, acuminate, about 1.5 mm. long. Corolla 1.5 to 2 cm. long, slightly puberulent, the lower lip nearly 1 cm. long, the upper short, 3-lobed. Nutlets ovoid, 1.7 mm. long, smooth, glabrous, shining.

LUZON, District of Lepanto, Mount Data (4502, 4483, 4505 *Merrill*) November, 1905. In the mossy forest at about 2,200 m., abundant.

Var. **crispipila,** n. var.

Similar to the species, flowers white, the inflorescence puberulent and with many crisped ferruginous hairs, the leaves also with few or many crisped hairs on both surfaces and margins.

LUZON, Province of Benguet, Suyoc to Pauai (4780 *Merrill*) November, 1905. On high ridges in the mossy forest at about 2,200 m.

PLECTRANTHUS L'Her.

Plectranthus diffusus Merrill sp. nov.

A much branched, diffuse, lax herb 1.5 to 2.5 m. high with many flowered narrow lateral panicles forming large compound terminal leafy panicles, more or less pubescent throughout with pale or ferruginous hairs. Branches angled, gray or brownish, pubescent. Leaves ovate to oblong-ovate, 2 to 6 cm. long, 1 to 3 cm. wide, membranous, acuminate, the base acute, entire below, above rather prominently serrate-dentate, with scattered crisped hairs on both surfaces; nerves, 5 to 6 on each side of the midrib; petioles 1 cm. long or less. Branchlets of the inflorescence opposite, several flowered, 1.5 cm. long or less, the bracts foliaceous, gradually reduced upwards. Calyx somewhat hirsute, about 2 mm. long, subequally 5-toothed, the teeth acute, less than 0.5 mm. long. Corolla deep purplish blue, 5 to 6 mm. long, straight, somewhat pubescent outside, the limb gibbous, 2-lipped, the upper lip short, 3-lobed, the lower one entire about 3 mm. long. Stamens free, filaments very slightly pubescent below. Calyx in fruit scarcely accrescent, reflexed. Nutlets ovoid or elliptical, glabrous, smooth, about 1 mm. long.

LUZON, District of Lepanto, Mount Data (4554 *Merrill*) November 4, 1905. In damp shaded ravines along streams at about 2,000 m.

SOLANACEÆ.

SOLANUM Linn.

Solanum inaequilaterale Merrill sp. nov.

An unarmed, more or less stellate pubescent shrub 2 to 3 m. high, with alternate subentire or undulate leaves and extra-axillary cymes. Branches light gray, glabrous, the younger ones black when dry, more or less densely stellate pubescent. Leaves membranous or submembranous, oblong-ovate, acute or acuminate, the base acute or obtuse, inequilateral, the lamina on one side of the midrib extending somewhat down the petiole, the margins entire or somewhat undulate, glabrous above, more or less densely stellate pubescent beneath, the young leaves very densely so, the older ones subglabrous; nerves 5 to 6 on each side of the midrib; petioles 2 to 3 cm. long. Cymes peduncled, stellate pubescent, densely or laxly flowered, about 5 cm. long. Calyx densely stellate pubescent, about 4 mm. long, subtruncate or obscurely 5-toothed. Corolla pale purple, 11 mm. long, stellate pubescent outside, the tube 2 mm. long, the 5 lobes oblong to oblong-lanceolate, acute, about 3 mm. wide. Stamens 5, oblong, about 5 mm. long. Ovary 2-celled, glabrous or slightly pubescent at the apex, the style glabrous, about 6 mm. long. Fruit globose, glabrous, shining, bright red when mature, about 7 mm. in diameter, the calyx not enlarged. Seed 2 to 2.5 mm. in diameter. Inflorescence becoming nearly or quite glabrous in fruit.

LUZON, Province of Benguet, Suyoc to Pauai (4807 *Merrill*) November 7, 1905. Border of the mossy forest on high ridges at about 2,000 m. No. 6204 *Elmer*, from Sablan, the same province, appears to be a form of this species with thin, less pubescent leaves and longer, lax cymes.

SCROPHULARIACEÆ.

ALECTRA Thunb.

Alectra dentata (Benth.) O. Kuntze Rev. Gen. Pl. (1891) 458. *Hymenospermum dentatum* Benth. in Wall. Cat. 3963. *Alectra indica* Benth. in DC. Prodr. **10** (1846) 339; Hook. f. Fl. Brit. Ind. **4** (1884) 297; Forbes & Hemsl. Journ. Linn. Soc. Bot. **26** (1890) 201. *Melasma indica* Wettst. in Engl. und Prantl. Nat. Pflanzenfam. 4 (1891) **3B:** 91.

LUZON, Province of Benguet, Baguio to Ambuklao (4350 *Merrill*) October 24, 1905. Dry open grass lands in thin pine forests at about 1,500 m. Not previously reported from the Philippines.

Southern China to the mountains of Burma, India, and Mauritius.

EUPHRASIA Linn.

Euphrasia borneensis Stapf, Trans. Linn. Soc. Bot. II. 4 (1894) 210. *pl. 16. f. 1–16.*

LUZON, Province of Benguet, Suyoc to Pauai (4720, 4722 *Merrill*) November 7, 1905. On dry open grassy ridges at about 2,200 m.

No species of the genus has been previously reported from the Philippines, *Euphrasia borneensis* having previously been known only from the type locality, Mount Kanabalu, British North Borneo. The specimens cited above differ from *Euphrasia borneensis* as described by Stapf in some slight minor characters, but these I believe are scarcely sufficient to warrant the distinguishing of the Philippine plant as a distinct species. *Gaultheria borneensis* Stapf, also originally described from Mount Kinabalu specimens, and later reported from the Philippines by Rendle,[25] was also found near Pauai (4796 *Merrill*).

SOPUBIA Hamilt.

Sopubia trifida Hamilt. in D. Don Prodr. Fl. Nepaul. (1802) 88; Hook. f. Fl. Brit. Ind. **4** (1884) 302; Benth. in DC. Prodr. **10** (1846) 522; Forbes & Hemsl. Journ. Linn. Soc. Bot. **26** (1890) 202.

LUZON, Province of Benguet, Baguio (6518 *Elmer*) June, 1904. On grassy hillsides in thin pine forests at an altitude of about 1,500 m. Flowers yellowish, the throat pink or purplish.

No representative of the genus has previously been reported from the Philippines, the above species extending from southern China to British India and Ceylon.

VANDELLIA Linn.

Vandellia grandiflora Merrill sp. nov.

An erect or spreading, simple or slightly branched, more or less hirsute herb 10 cm. high or less, the calyx teeth 5, equal, less than half as long as the calyx tube, the corolla about 12 mm. long. Branches, leaves, petioles, pedicels, and calyces sparingly hirsute with scattered white hairs. Leaves opposite, ovate to oblong-ovate, 0.5 to 1.5 cm. long, short petioled, acute, the base obtuse, the margins usually coarsely serrate. Flowers solitary, pediceled, axillary, the pedicels 1.5 to 2 cm. long. Calyx in anthesis oblong, 6 mm. long, not keeled or winged, reticulate, equally 5-toothed, the teeth lanceolate, acuminate, about 2.5 mm. long. Corolla pale blue or purplish, the tube cylindrical, enlarged above, upper lip broad, about 4 mm. long, cleft at the apex, the lower lip 6 to 7 mm. long, 3-lobed, the middle lobe the largest. Stamens 4, the two posterior included, the two anterior longer and prominently appendaged near the base of the filaments. Ovary and style glabrous. Fruiting calyx about 8 mm. long, oblong, the teeth scarcely longer than in anthesis. Capsule oblong, glabrous, tipped by the style, equaling or slightly shorter than the calyx. Seeds many, flattened, ovate, about 0.5 mm. in diameter.

LUZON, District of Lepanto, Mount Data (4572 *Merrill*) November 4, 1905: Province of Benguet, Baguio to Ambuklao (4359 *Merrill*) October 24, 1905; Suyoc to Pauai (4735 *Merrill*) November 7, 1905. On dry open grassy slopes in thin pine forests 1,600 to 2,000 m.

BIGNONIACEÆ.

NYCTICALOS Teysm. et Binn.

Nycticalos cuspidatum (Blume) Miq. Ann. Mus. Bot. Lugd. Bat. **3** (1867) 249, *t. 8. f. B. Tecoma cuspidata* Blume, Rumphia **4** (1848) 35.

PALAWAN, Puerto Princesa (254 *Bermejos*) December, 1905. In forests; flowers yellow. Celebes and the Moluccas.

An undetermined species of this genus has previously been reported from Luzon by Ceron,[26] No. 3395 *Vidal*, but our specimen cited does not appear to be sufficiently distinct from Miquel's species. The Palawan specimens differ from *Nycticalos cuspidatum* as described by Miquel in having shorter petioles, and slightly larger calyces, while the leaves are acute, scarcely cuspidate.

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[25] *Journ. Bot.* (1896) **34**, 355.

RADERMACHERA Hassk.

Radermachera biternata Merrill sp. nov.

A small tree about 8 m. high, quite glabrous throughout, with bipinnate leaves, elliptical-ovate, usually obtuse leaflets and few flowered panicles much shorter than the leaves, the flowers about 5.5 cm. long. Branches gray or brownish, the younger parts black when dry. Leaves 20 cm. long or less, opposite, biternate; leaflets 5 to 9 cm. long, 2.5 to 5 cm. wide, subcoriaceous, shining, the apex rounded obtuse or broadly acute, the base acute, the margins revolute; primary nerves about 10 on each side of the midrib, rather distinct beneath, the reticulations netted, rather close; petiolules of the lateral leaflets 1.5 cm. long or less, of the terminal ones about 3 cm. long. Inflorescence much reduced, the rhachis 3 cm. long or less, the branches very short or none. Flowers few. Calyx about 1 cm long, closed in bud, in anthesis unequally 3-lobed, the lobes short, acute. Corolla 5 to 5.5 cm. long, the tubular portion less than 1 cm. long, about 3.5 mm. in diameter, enlarged-ventricose above, the lobes about 1.5 cm. long, rounded, entire, glabrous pink or pale purple. Stamens about 2 cm. long. Style 2.5 cm. long. Fruit unknown.

CULION (568 *Merrill*) December 24, 1902. BUSUANGA (3491 *Curran*) December 31, 1905, both of these islands belonging to the Calamianes Group, between Mindoro and Palawan.

A species growing in open grassy valleys slightly above the sea level well characterized by its much reduced inflorescence and large flowers.

RUBIACEÆ.

GALIUM Linn.

Galium philippinense Merrill sp. nov. *G. ciliare* Elm. Leaf. Philip. Bot. (1906) 4, non Hook.

A tufted erect or diffuse, much branched perennial, more or less ciliate-pilose herb 10 to 30 cm. high, the leaves in whorls of fours, 3-nerved from the base, the cymes short, lateral, few flowered. Branches 4-angled, more or less pilose when young, but not hispid, becoming nearly glabrous. Leaves elliptical-ovate, sessile or nearly so, 5 to 8 mm. long, 2 to 4 mm. wide, acute at both ends, more or less ciliate-pilose with long scattered white hairs, 3-nerved. Cymes about 1 cm. long, mostly 5-flowered, the peduncles 1 cm. long or less, glabrous or nearly so, the bracts foliaceous, oblong-lanceolate, about 2 cm. long. Flowers white, corolla rotate, 0.8 mm. long, 4-lobed, the lobes ovate, obtuse. Calyx tube ovoid. Fruit about 1 mm. in diameter, glabrous or somewhat rugose when dry.

[26] *Cat. Pl. Herb.* (1892), 127.

LUZON, Province of Benguet, Mount Santo Tomas (6557 *Elmer*) June, 1904: District of Lepanto, Mount Data (4531 *Merrill*) November, 1905. On dry grassy slopes in thin pine forest above 2,000 m. A second Philippine species is represented by No. 6592 *Elmer* and No. 4414 *Merrill* from Benguet Province. From the descriptions available, and without access to authentic material, I am unable to separate these two numbers from the Australian *Galium gaudichaudii* DC., as determined by Mr. Elmer.

HEDYOTIS Linn.

Hedyotis microphylla Merrill sp. nov.

An erect glabrous shrub or undershrub 1 to 2 m. high, with small, obscurely nerved, usually ovate-lanceolate leaves 1 to 3 cm. long, and axillary and terminal peduncled, usually 3-flowered cymes, the capsules 2-celled, septicidal. Branches slender light gray, quadrangular. Leaves submembranous dull or slightly shining, somewhat paler beneath, 5 to 8 mm. wide, the base acute, the apex acute or slightly acuminate, often blunt; nerves very obscure, nearly obsolete, about 3 on each side of the midrib; stipules short, 3-partite, the lobes narrow. Cymes 1 to 2 cm. long, the bracts foliaceous often 3 mm. long, the pedicels about 5 mm. long. Flowers white. Calyx 3 mm. long, the tube ovoid 1.5 mm. long, the lobes 4, persistent, oblong ovate, obtuse, about 1.5 mm. long. Corolla 5 mm. long, glabrous outside, the throat and base of the lobes villous inside, the tube broad, the lobes recurved, oblong ovate or ovate, acute, about 2 mm. long. Filaments nearly 2 mm. long; anthers narrowly oblong, 1.5 mm. Ovary 2-celled, each few ovuled; style 2.5 mm. long; stigma 2-cleft. Capsule elliptical-ovoid about 4 mm. long crowned by the calyx lobes, 2-celled, each cell with 2 or 3 flattened elliptical seeds about 1.5 mm. long, at length septicidally dehiscent from the apex.

LUZON, Province of Benguet, Pauai to Baguio (4693 *Merrill*) November, 1905; Suyoc to Pauai (4736 *Merrill*) November, 1905. On high ridges in the mossy forest 2,000 to 2,300 m.

PAVETTA Linn.

Pavetta dolichostyla Merrill sp. nov.

A small shrub about 2 m. high with membranous slightly pubescent or nearly glabrous leaves and peduncled terminal cymes, the corolla tubes 3 cm. long, the exserted portion of the styles 4 to 4.5 cm. long. Branches greenish, glabrous, the stipules glabrous, narrowly ovate, 6 to 7 mm. long, acuminate, deciduous. Leaves 20 to 25 cm. long, 7 to 9 cm. wide, oblong oblanceolate to broadly oblong-lanceolate, gradually narrowed below to the acute or acuminate base, and above to the acuminate apex, shining above, beneath paler and puberulent on the midrib and lateral nerves; nerves 12 to 14 on each side of the midrib, curved, anastomosing, the reticulations lax; petioles 1 to 2.5 cm. long, pubescent. Cymes terminal, pubescent, about 3 from each branchlet, few flowered, the peduncles 1.5 cm. long, subtended by broad bracts, the upper bracts and bracteoles linear to linear-lanceolate. Pedicels pubescent, 3 to 4 mm. long. Calyx cup-shaped, about 2.5 mm. long, pubescent with short spreading hairs. 4-toothed, the teeth acute, 0.5 mm. long. Corolla slender, glabrous, white, 3 cm. long, the lobes spreading, oblong-lanceolate to oblong-oblanceolate, obtuse, 10 mm. long, 3 to 3.5 mm. wide. Anthers linear, 5 to 6 mm. long, spirally twisted when dry. Exserted portion of the style slender, glabrous 4 to 4.5 cm. long.

MINDORO, Bongabong River (3714 *Merritt*) March 21, 1906. In forests, river valley near sea level. A species well characterized by its long corolla tubes and very long exserted styles.

PSYCHOTRIA Linn.

Psychotria crispipila Merrill sp. nov.

A shrub 3 to 4 m. high with elliptical-ovate leaves which are prominently nerved and rather densely fulvous pubescent beneath with crisped hairs, the flowers crowded in dense subcapitate cymes on 2.5 to 4 cm. long terminal peduncles. Branches, petioles, and inflorescence also rather densely fulvous pubescent with crisped hairs. Leaves 7 to 10 cm. long, 3 to 5 cm. wide about equally narrowed to both the acute apex and base, coriaceous, glabrous above; nerves 9 to 11 on each side of the midrib, obscure above, prominent beneath, parallel, anastomosing near the margin, the reticulations obscure; petioles 1 to 1.5 cm. long; stipules caducous. Peduncles 2 or 3 from each branchlet. Flowers white, sessile or short peduceled. Calyx 3 to 4 mm. long obscurely 4-toothed or subtruncate, fulvous pubescent with crisped hairs especially on the margin. Corolla 5 mm. long glabrous outside, the throat villous within, 4-cleft to or below the middle, the lobes oblong-ovate, obtuse, 2 to 3 mm. long. Filaments and anthers each about 1 mm. long, the latter elliptical-oblong. Ovary 2-celled, each cell with one ascending ovule; style about 2 mm. long. Fruit unknown.

LUZON, District of Lepanto, Mount Data (4490 *Merrill*) November, 1905. In the mossy forest at 2,200 m.

Related to *Psychotria bataanensis* Elmer, differing from that species in its elongated peduncles, densely crisped fulvous pubescent branches, petioles, under surface of its leaves and inflorescence. The leaves in the present species are always acute at the base, while in *P. bataanensis* they are narrowly cordate or auriculate.

CAPRIFOLIACEÆ.

LONICERA Linn.

Lonicera philippinensis Merrill sp. nov.

A scandent glabrous or nearly glabrous shrub 2 to 3 m. high, with 2-lipped corollas about 1.5 cm. long. Branches dark brown, glabrous, shining obscurely angled, slender, the young parts sparingly hirsute. Leaves narrowly oblong-ovate, entire, acute, the base broad, truncate or subcordate, 2.5 to 4 cm. long, 1 to 2 cm. wide, coriaceous, shining above, quite glabrous or sparingly hirsute on the midrib on both surfaces; nerves about 5 on each side of the midrib, the reticulations distinct;

petioles about 5 mm. long, rugose, sparingly hirsute, becoming glabrous. Flowers white, turning yellowish in age, faintly odorous, in pairs in the upper axils, nearly sessile. Calyx 4 mm. long, ovoid, glabrous, the teeth ovate, acute, 5 mm. long, slightly hirsute-ciliate, the bract linear, glabrous or nearly so, about 3 mm. long. Corolla glabrous outside, hirsute inside, the tube about 7 mm. long. Anthers oblong, 4 mm. long; filaments hirsute. Ovary 3-celled; style about 13 mm. long, slender, hirsute except just below the stigma. Fruit subglobose or ovoid, glabrous, black when mature, 5 to 6 mm. in diameter; seeds few, 2 or 3, about 4 mm. long.

LUZON, Province of Benguet, Pauai (4775 *Merrill*) November 8, 1905. In thickets, border of mossy forest at about 2,200 m.

A species of the § *Nintooa*, subsect. *Breviflorae*, apparently most closely related to *Lonicera glabrata* Wall., of the Himalayan region, and quite distinct from the only other known Philippine species of the genus, *L. rehderi* Merr., which is also known only from the same province as is the present species.

CUCURBITACEÆ.

ZANONIA Linn.

Zanonia philippinensis Merrill sp. nov.

Scandent in large trees reaching a height of from 30 to 50 m. Branches rather slender, striate, glabrous, grayish brown. Tendrils glabrous 8 to 10 cm. long or more. Leaves ovate, the base broad, somewhat cordate, coriaceous, glabrous, shining on both surfaces, paler beneath, the apex acute, 15 to 24 cm. long, 10 to 12 cm. wide, 3-nerved from the base, the lateral nerves prominent, few, distant; petioles 2 to 3.5 cm. long. Flowers unknown. Fruit subglobose, brown, glabrous, somewhat shining, the pericarp brittle when dry, about 20 cm. in diameter. Seeds indefinite, elliptical, flattened, 2.5 cm. long, 1.5 cm. wide, wings membranous, surrounding the seed, each about 6 cm. long, 4 cm. wide, the base entire, curved, the apex irregularly lobed or toothed.

MINDANAO, Lake Lanao, Camp Keithley (324 *Mrs. Clemens*) February, 1905. A species evidently related to the Malayan *Zanonia macrocarpa* Blume, differing from the latter in its cordate leaves, smaller seeds which have much wider and somewhat longer wings than in Blume's species. Of this genus, *Zanonia indica* Linn., has been reported from the Philippines by F.-Villar, but his record has never been verified.

CAMPANULACEÆ.

PRATIA Gaud.

Pratia begonifolia Lindl. Bot. Reg. *t. 1373;* Clarke in Hook. f. Fl. Brit. Ind. **3** (1881) 422; Forbes & Hemsl. Journ. Linn. Soc. Bot. **26** (1889) 2.

LUZON, Province of Benguet, Sablan (6201 *Elmer*) April, 1904; Baguio to Ambuklao (4369 *Merrill*) October 24, 1905. Growing on steep damp banks in ravines. Japan to Central and Southern China, Formosa, Eastern India, and Malaya.

No species of the genus previously reported from the Philippines.

WAHLENBERGIA Schrad.

Wahlenbergia bivalvis Merrill sp. nov.

An erect, glabrous, lax, branched, annual herb 20 to 40 cm. high with linear or linear-lanceolate entire leaves and solitary, long peduncled, blue flowers, the capsule 2-celled, 2-valved at the apex inside the persistent calyx teeth. Branches slender, terete. Leaves 1.5 to 3 cm. long, 1 to 4.5 mm. wide, acuminate, sessile or the basal ones petioled and sometimes sparingly pilose, the margins thickened, the lateral nerves obsolete. Peduncles solitary, slender, 10 cm. long or less. Calyx glabrous, 5 mm. long, the tube 3 mm. long, oblong-ovoid, the lobes 5, erect, linear-lanceolate, acute, 2 mm. long. Corolla blue, campanulate, about 7 mm. long, 5-lobed, the tube nearly 3 mm. long, the lobes oblong, acute, about 2 mm. wide. Stamens free; anthers narrow, 2 mm. long. Ovary inferior, 2-celled; style nearly 4 mm. long; stigma broadly lobed. Capsule membranous, oblong, 6 mm. long, 3 mm. in diameter, 2-celled, 2-valved at the apex inside the persistent erect calyx teeth, the apex convex, subconical. Seeds indefinite, elliptical-oblong, glabrous, 0.5 mm. long.

LUZON, Province of Benguet, Mount Tonglon (Santo Tomas) (4811 *Merrill*) November 12, 1905; Baguio to Ambuklao (4361 *Merrill*) October 24, 1905: District of Lepanto, Mount Data (4559 *Merrill*) November 4, 1905.

A species apparently distinct from *Wahlenbergia gracilis* A. DC., especially in its 2-celled, 2-valved capsules, growing on dry open grassy slopes in thin pine forests 1,600 to 2,100 m., widely distributed but not abundant.

COMPOSITÆ.

AINSLIAEA DC.

Ainsliaea reflexa Merrill sp. nov.

Erect, simple, the leaves mostly radical, long petioled, the petioles winged-margined, the inflorescence long, racemose, the heads 3-flowered, about 12 mm. long, solitary or in pairs. Stems glabrous, terete, simple, erect 20 to 60 cm. tall with few reduced linear-lanceolate leaves. Radical leaves membranous, glabrous or with few long hairs beneath and on the midrib above, the blade elliptical-oblong to oblong-ovate, 2.5 to 6 cm. long, 1 to 2 cm. wide, acute, with distant, short spinulose teeth the nerves 2 to 3 on each side of the midrib, rather abruptly contracted at the base; petioles narrowly winged, much exceeding the lamina 6 to 8 cm. long. Heads narrow, pedicellate, the pedicels 2 to 3 mm. long, pubescent, mostly reflexed, at least in anthesis. Involucral bracts sparingly pilose with scattered hairs, the lower ones 1.5 mm. long, ovate to lanceolate, acuminate, the inner ones linear-lanceolate to linear-oblanceolate, 12 mm. long, about 1.8 mm. wide. Achenes 4.5 to 5 mm. long, 10 ribbed, somewhat compressed, about 1 mm. thick above, pilose with scattered spreading white hairs; pappus brownish, the bristles about 30 on each achene, 6 to 7 mm. long, plumose-pilose with 1 mm. long hairs.

LUZON, District of Lepanto, Mount Data (4571 *Merrill*) November 4, 1905. Abundant in the mossy forests at about 2,200 m.

Another form of this species is apparently represented by No. 4824 *Merrill*, Mount Tonglon, Province of Benguet, Luzon, November 12, 1905, this number growing under similar conditions as the preceding, but with the petioles scarcely exceeding the leaf blade in length. No species of the genus has previously been reported from the Philippines, the present species being apparently related to *Ainsliaea pteropoda* DC.

CARPESIUM Linn.

Carpesium cernuum Linn. Sp. Pl. (1753) 859; Clarke in Hook. f. Fl. Brit. Ind. **3** (1881) 300; Forbes & Hemsl. Journ. Linn. Soc. Bot. **23** (1888) 430.

LUZON, Province of Benguet, Mount Tonglon (4832 *Merrill*) November 12, 1905; Suyoc to Pauai (4688 *Merrill*) November 7, 1905: District of Lepanto, Mount Data (4512 *Merrill*) November, 1905.

A decidedly interesting addition to our knowledge of the northern element in the Philippine flora, growing in the mossy forests on the higher mountains and ridges above 2,000 m., no species of the genus having been previously reported from the Philippines. The form here referred to *Carpesium cernuum* Linn. is apparently closest to the var. *glandulosum* Clarke in Hook. f. Fl. Brit. Ind. **3** (1881) 301.

This exceedingly variable species extends from France to the Caucasus, the temperate Himalayan region, Khasia and Nilgherry Mountains, China, and Japan, also according to Clarke to Java. I can find no record of its having been found in southern China or Formosa although another species, *C. abrotanoides* Linn., has been encountered in the latter place.

DICHROCEPHALA DC.

Dichrocephala chrysanthemifolia DC. Prodr. **5** (1836) 372; Hook. Fl. Brit. Ind. **3** (1881) 245; Forbes & Hemsl. Journ. Linn. Soc. Bot. **23** (1888) 406.

LUZON, District of Lepanto, Mount Data (4533 *Merrill*) November, 1905. On dry grassy slopes in thin pine forests at about 2,000 m., the second species of the genus to be found in the Philippines. China to British India and tropical Africa.

EMILIA Cass.

Emilia pinnatifida Merrill sp. nov.

An erect, simple or slightly branched herb 15 to 35 cm. high with glabrous or more or less pubescent usually finely lyrately lobed leaves, the involucral bracts much shorter than the flowers. Stems glabrous, finely channeled. Leaves various, the radical ones sessile or short petioled, 4 to 5 cm. long or less, 1 to 1.5 cm. wide, glabrous or with scattered weak hairs beneath, the lobes irregular, 2 to 4 mm. wide, often extending nearly to the midrib, their margins irregularly crenate, the terminal lobe usually larger than the lateral ones; cauline leaves similar to the radical, sessile, clasping, few, the lower ones as long as the radical leaves, the upper one much reduced. Peduncles 2 to 7 cm. long. Heads 1 cm. long, the flowers pink. Involucral bracts glabrous, 1-seriate, 7 to 8 mm. long, about 5 mm. wide, oblong-lanceolate, acute or slightly acute, about 5-nerved. Achenes when mature nearly 3 mm. long, obscurely angled, finely pubescent; pappus copious, soft, white, about 6 mm. long, minutely scabrid. Corollas slender, 7 to 8 mm. long, 5-lobed, the lobes lanceolate, acute or obtuse, about 2.5 mm. long. Style arms nearly 1.5 mm. long. Anthers slender, 3 mm. long or less.

LUZON, Province of Benguet, Bugias (4664 *Merrill*) October 28, 1905. The following specimens are apparently referable here: Benguet, Baguio (6599, 6606 *Elmer*) June, 1904; (4265 *Merrill*) October, 1905.

A species characteristic of the open, dry, grassy slopes in thin pine forests from 1,500 to 2,100 m., widely distributed in Benguet and Lepanto; abundant. The species here proposed differs from *Emilia sonchifolia* DC., in the involucral bracts being constantly much shorter than the flowers, in this character approaching *Emilia flammea* Cass. As in *Emilia sonchifolia*, the species is exceedingly variable, but is apparently distinct from all other previously described forms. *Emilia sonchifolia* Elmer, in herb.

GYNURA Cass.

Gynura clementis Merrill sp. nov.

Scandent, more or less pubescent with crisped hairs throughout. Branches dark brown, obscurely angled, ferruginous crisped pubescent with scattered hairs. Leaves alternate, elliptical-oblong to narrowly oblong-obovate, 5 to 8 cm. long, 1.5 to 3.5 cm. wide, coriaceous, acute at both ends, coarsely irregularly toothed, the teeth acute, the upper surface subscabrid, the lower rather densely ferruginous pubescent; nerves 5 to 6 on each side of the midrib; petioles 0.8 to 1.5 cm. long, pubescent, the stipules orbicular, often 1 cm. in diameter. Heads purplish, about 25-flowered, 1.5 cm. long or less, in few flowered axillary and terminal corymbs 10 cm. long or less. Involucre cylindrical or subcampanulate, the bracts 8, oblong-lanceolate, acute, 7 to 8 mm. long, 1.5 to 2.5 mm. wide, somewhat pubescent with crisped hairs, and with several short linear bracteoles at the base. Flowers homogamous, purplish, slender, about 12 mm. long including the achene, the tube 7 mm. long, the upper slightly expanded portion about 3 mm. long, the teeth 5, lanceolate, acute, 1.5 mm. long. Stamens 5; anthers 2 mm. long, lanceolate, the cells not produced at the base. Style arms 3 mm. long, slightly pubescent. Achenes oblong, 3 mm. long, brown, about 10-ribbed, sparingly hispid. Disk glabrous, pitted.

MINDANAO, Lake Lanao, Camp Keithley (49 *Mrs. Clemens*) January, 1906.

MYRIACTIS Less.

Myriactis humilis Merrill sp. nov.

An herb 20 cm. high or less, sparingly pilose or nearly glabrous, with long petioled deeply and coarsely pinnately lobed leaves and solitary long peduncled heads about 7 mm. in diameter. Branches few, terete, with few scattered weak hairs. Leaves membranous, 3 to 5 cm. long, 1.5 to 3 cm. wide, coarsely lyrately lobed, the lobes entire or coarsely toothed, apiculate, both surfaces with few scattered weak hairs, the upper leaves much smaller, the uppermost entire and bract like; petioles 1 to 3 cm. long. Peduncles slender, 5 cm. long or less, solitary. Heads 5 mm. long, the ray flowers short, white, the disk flowers greenish yellow;

involucral bracts 2-seriate, narrowly oblong, obtuse or acute, sparingly pilose on the median portion, about 4 mm. long, 1 mm. wide. Ray flowers pistillate, ligulate, 2 or more seriate, the ligule oblong about 1.5 mm. long or less; style short, 2-cleft at the apex. Disk flowers greenish yellow, tubular, hermaphrodite. Corolla 1.5 mm. long, regularly 5-cleft, the lobes 1 mm. long, acute. Anthers oblong-ovate, acute, the base obtuse. Style equaling the corolla, 2-cleft at the apex. Achenes compressed, glabrous, oblong, the margins thickened, 3 mm. long, 1.2 mm. wide, tipped with a short somewhat glandular ring. Pappus 0.

LUZON, District of Lepanto, Mount Data (4530 *Merrill*) November, 1905. Common in the damp, mossy forests at 2,100 m. and above. The first species of the genus to be reported from the Philippines.

SENECIO Linn.

Senecio luzoniensis Merrill sp. nov.

An erect, stout, glabrous, simple or sparingly branched herb about 1 m. high, with oblong-lanceolate, coriaceous, rather obscurely irregularly crenate leaves and terminal corymbose many flowered panicles, the heads about 1 to 1.3 cm. long, 1.5 cm. or more in diameter, including the rays. Stems terete, firm, glabrous, reddish brown. Leaves 10 to 15 cm. long, 1.5 to 2.5 cm. wide, glabrous, strongly reticulate veined, the upper ones sessile or subsessile, the lower ones petiolate, the petiole 1 cm. long, base acute, apex usually long acuminate. Panicles about 15 cm. long, nearly as wide, the branches ascending, the bracts and bracteoles linear, the primary branches subtended by linear 3 to 4 cm. long leaf-like bracts, the bracteoles usually about 2 or 3 mm. long. Heads about 25-flowered; involucral bracts about 13, 1-seriate, imbricate, free, oblong-lanceolate, 7 to 8 mm. long, 1.5 to 2 mm. wide, acute glabrous, membranous margined, a few short outer bracts at the base. Ray flowers about 6 in each head, yellow, the tube slender, 4 to 5 mm. long, the ligule oblong, 10 to 11 mm. long, 3.5 mm. wide, strongly 4-nerved, obtuse, the apex with three small blunt teeth. Disk flowers yellow, the corolla tubular, inflated above, about 8 mm. long, 5-lobed, the lobes about 1.3 mm. long, oblong, blunt. Anthers slender, about 3 mm. long, blunt at the base. Style 2-cleft, the arms about 1.5 mm. long, truncate. Achenes about 4 mm. long, less than 1 mm. thick obscurely 10-striate, glabrous, narrowly oblong. Disk paleaceous.

LUZON, Province of Benguet, Suyoc to Pauai (4791 *Merrill*) November 7, 1905. A stout erect herb growing in grass lands on high ridges near the lower limits of the mossy forest at about 2,150 m.

SOLIDAGO Linn.

Solidago virgaurea Linn. Sp. Pl. (1753), 880.

LUZON, Province of Benguet, Baguio to Ambuklao (4364 *Merrill*) October 24, 1905. Widely distributed in the region of *Pinus insularis* Endl., 1,500 to 2,000 m. North America, Europe, and temperate Asia south to Formosa.

SPILANTHES Linn.

Spilanthes ovata Merrill sp. nov.

An erect or spreading slightly branched, nearly glabrous herb with opposite, short, broadly-ovate to triangular-ovate, irregularly and rather coarsely crenate-dentate acute leaves and solitary long peduncled radiate heads about 1.5 cm. in diameter. Branches purplish, somewhat angled or channeled, glabrous or sparingly pubescent. Leaves membranous or submembranous, 2.5 cm. long or less, 1.2 to 1.8 cm. wide, the base broad, truncate or slightly cordate, 3-nerved, paler beneath, the margins thickened, usually somewhat ciliate, the nerves rather prominent beneath, often with few scattered hairs, the reticulations distinct; petioles 3 to 4 mm. long. Peduncles about 7 cm. long. Heads yellow; involucral bracts sub 2-seriate, oblong-lanceolate, acute or acuminate, about 5 mm. long, the margins ciliate. Ray flowers about 10, the tube ciliate, about 2 mm. long, the ligule oblong-ovate, 10 mm. long, 4 mm. wide, 10-nerved, truncate, 3-toothed at the apex, the teeth short, rounded. Disk flowers tubular, the corolla 5-toothed, the teeth about 0.8 mm. long, acute. Anthers about 1 mm. long, the cells acute at the base. Style arms nearly 1 mm. long, truncate. Achenes 2 mm. long, flattened, 2-keeled, ciliate on the keels; pappus of 2 slender, scabrid, 1 mm. long bristles, the achenes of the ray flowers triquetrous. Pales 4 to 5 mm. long, keeled, or the inner ones flat or nearly so, 3-nerved, obtuse, irregularly minutely toothed at the apex, the keel minutely scabrid.

LUZON, District of Lepanto, Mount Data (4573 *Merrill*) November 4, 1905. Rather common on dry grassy slopes in thin pine forests at about 2,100 m.

A species apparently closely related to *Spilanthes grandiflora* Turcz., differing from that species in its much shorter, very differently shaped leaves.

THE PHILIPPINE
JOURNAL OF SCIENCE

VOL. I SEPTEMBER 15, 1906 SUPPLEMENT IV

NEW PHILIPPINE ACANTHACEÆ.

By C. B. CLARKE.
(*Kew, England.*)

HEMIGRAPHIS Nees.

Hemigraphis fruticulosa (C. B. Clarke ms. in *Loher* nn. 4251, 4252).

Parva, fruticulosa, repens, ramosa, sparsim pilosa; foliis 10–14 mm. longis, late ovatis, obtusis, breviter petiolatis; capitulis terminalibus, paucifloris, laxiusculis; ceteroquin ut *H. reptans* Hemsl.

Corolla 1 cm. longa. Folia dura, in face superiore sublucida rhaphidibus inspersa, in face inferiore pilosula. Capsula 7 mm. longa, linearis, 6-sperma. Pollina parva, late elliptica, fere leve, poris 2.

LUZON, District of Lepanto, Cervantes to Mancayan (4465 *Merrill*) November, 1905.

Hemigraphis hirsuta T. Anders. in Journ. Agr. Hort. Soc. Ind. N. S. 1 (1868) 270.

PALAWAN (290 *Bermejos*) January, 1906, in forests at Tanabag near Puerto Princesa. New to the Philippines. Malaya.

HYPOESTES R. Br.

Hypoestes acutior sp. nov.

Foliis 10–15 cm. longis, lanceolatis aut ovato-lanceolatis, utrinque acuminatis; paniculis compositis, laxiusculis, pubescentibus, viscosulis; involucris 12 mm. longis, lobis 2, lanceolatis, apice subacute triangularibus; ceteroquin ut *H. Vidalii* C. B. Clarke.

LUZON, Province of Rizal, Bosoboso (62 *Foxworthy*) January, 1906. MINDANAO, Lake Lanao, Camp Keithley (276 *Mrs. Clemens*) February, 1906.

Hypoestes Palawanensis sp. nov.

Foliorum lamina 22 mm. longa, 10 cm. lata, glabrata, utrinque acuta; petiolo usque ad 5 cm. longo; panicula 8 cm. longa, 4 cm. lata, perdensa, hirsuta; involucris 15 mm. longis, lobis apice lanceolatis.

PALAWAN (316 *Bermejos*) January, 1906, in forests at Tanabag, near Puerto Princesa.

This species resembles *Vidal* No. 3401, an undescribed Philippine species, in which, however, the involucres are about 8 mm. long, hardly half the length of those of *H. Palawanensis*.

JUSTICIA Linn.

Justicia Vidalii (C. B. Clarke ms. in *Vidal* n. 3402).

Inflorescentia laxa stroboloidea; bracteis (foliis floralibus) spatulato-rotundatis, 5 mm. longis, proventu vix imbricatis, densius breviter villosis.

Leaf blades 18 by 8 cm., narrowed at either end, subglabrous; petioles 3 to 5 cm. long. Peduncles terminal and axillary the inflorescence paniculate. Sepals 3 mm. long, linear. Corolla 7 mm. long. Stamens 2, one anther cell below the other, tailed at the base. Pollen ellipsoid with one row of large dots longitudinal beside each stopple. Capsule 1 cm. long, stalked, hairy, 4-seeded.

PALAWAN (288 *Bermejos*). In forests at Tanabag, near Puerto Princesa, January, 1906.

RUELLIA Linn.

Ruelia (?) **nudispica** sp. nov.

Subacaulis, foliis 1 dm. longis, 4 cm. latis, oblongo-ellipticis, perobtusis, pilosulis; petiolo 8 mm. longo; pedunculo 5–8 cm. longo; spica 2–3 cm. longa, 6-flora; bracteis 2–4 mm. longis, lanceolatis; corolla 12 mm. longa; capsula 2 cm. longa, lineari-oblonga; seminibus 16–20, in margine dense hygroscopice villosis.

Stamens 4. Anther cells 2, divergent at the base, not tailed. Pollen globose. I had but one withered flower and obtained a very few imperfect pollen grains. The inflorescence does not suit *Ruellia*. The plant must, however, come into this group, as the seed with hygroscopic hairs will not do for *Gymnostachyum*.

PALAWAN (351 *Bermejos*) February, 1906, in forests near Puerto Princesa.

RUNGIA Nees.

Rungia lepida C. B. Clarke sp. nov.

Parva, ramulosa, undique pilosula, foliis late ovatis, usque ad 15 mm. longis, 14 mm. latis; spicis terminalibus, strobilatis, 5–6 mm. in diam., vel cylindricis, 2–3 cm. longis, vel abbreviatis 1 cm. longis, perdensis; bracteis 3 mm. in diam., rotundis, apice vix apiculatis, pilosis, in margine anguste alboscaricosis; corolla azurea.

LUZON, Lepanto (4450 *Merrill*) October, 1905.

Species *R. chinensi* Benth., affinis.

STROBILANTHES Blume.

Strobilanthes cincinnalis C. B. Clarke sp. nov.

Foliis (oppositis paullo inaequalibus) 9 cm. longis, 3 cm. latis, ellipticis, utrinque attenuatis, paullo denticulatis, in facie superiore a rhaphidibus minutis inspersis, in facie inferiore in nervo centrali puberulo-scabris; petiolo 5–8 mm. longo; inflorescentia 2–4-flora, cincinnali, floribus solitariis inter se 10–15 mm. distantibus; sepalis 12–15 mm. longis, lineari-oblongis, obtusis, fusco-nigris, hispido-scabris; capsula 15 mm. longa, glabra; seminibus 4, hygroscopice villosis.

LUZON, Lepanto, Mount Data (4574 *Merrill*) November, 1905, 2,250 m. s. m.
Strobilanthes Wallichii Nees, affinis.

NEW PHILIPPINE FERNS, II.

By Edwin Bingham Copeland.
(*From the Bureau of Education, Manila, P. I.*)

TRICHOMANES Sm.

Trichomanes Christii Copel. sp. nov.

Rhizomate late repente, 1 mm. crasso; stipitibus tenuibus, ca. 1 cm. altis, pilis brevissimis paucis pubescentibus; fronde 5–8 cm. altis, 25–35 mm. latis, acutis, tripinnatifidis; rhachi sursum anguste alata; pinnis oblongis, obtusis, infinis diminutis; segmentis integris, linearibus; urceolis infundibuliformi-campanulatis, anguste alatis alis saepius sub limbo evanescentibus, limbo leviter elato, subbilabiato, receptaculo incluso.

Mindoro, prope fluminem Baco. *Merrill* 1819.

Near *Trichomanes pyxidiferum* and *T. bipunctatum*, easily recognized by the comparatively large frond and short stipe, and included receptaculum.

CYATHEA J. Sm.

Cyathea tripinnata Copel. sp. nov.

Trunco erecto, 2 m. alto, 10 cm. crasso, albido-paleaceo, cicatricibus frondium 3.5–4 cm. altis latisque; stipitibus 60 cm. longis, 2–3 cm. crassis, basibus in coronam palearum albo-straminearum 3–5 cm. longarum 1 mm. latarum occultis, sursum rhachibusque sub tomento minuto denso fulvo atropurpureis, spinulis acutis sparsis 1 mm. altis asperis; fronde 2 m. longa, 1.5 m. lata, tripinnata; pinnis medialibus maximis, 80 cm. longis, 23 cm. latis, abrupte acutis; pinnulis^{i} 12 cm. longis, 20–25 mm. latis, abrupte acuminatis; pinnulis^{ii} ca. 12 mm. longis, 3 mm. latis, sessilibus, cordatis vel superioribus adnatis, subacutis, serrulatis, herbaceis, infra pallidioribus, paleis stramineis ad costas et rarissime ad venulas sparsis, aliter glabris; venulis apud costam furcatis; soris costalibus, ca. 1.5 mm. latis, utroque latere ca. 5, ad partem mediam pinnulae restrictis; indusio albo-stramineo, tenuissimo, in fragmenta sericea persistentia mox rupto.

Luzon, monte Mariveles, in cratere extincto, 900 m. s. m. *Copeland* 2068.

This has some characters in common with *C. arachnoidea* Hooker, but is a very distinct species.

ASPIDIUM Swartz.

Aspidium (Arcypteris) Bolsteri Copel. sp. nov.

Caudice adscendente, lignoso, 1.5–3 cm. crasso, paleis castaneis 15 mm. longis 2 mm. latis apiculatis coronato; stipitibus confertis, ca. 50 cm. altis, 8 mm. crassis, nisi ad pedes ca. 5 cm. altos alatis, alis ca. 15 mm. latis; fronde 60–80 cm. alta, ovata, pinnatifida, coriaceo-papyracea, glabra; segmentis ca. 5-jugatis, patentibus, ovatis, ca. 30 cm. longis, 10 cm. latis, acuminatis, integris, ala 15–30 mm. lata confluentibus, sinubus rhachin versus valde dilatatis; venis primariis fere ad marginem attingentibus, arcuatis, venulis transversalibus in parte fertile inconspicuis connexis; soris superficialibus, 1–1.5 mm. latis, inter venulas transversales biseriatis, in serie quaque 4–10, pagina tota usque ad marginem sorifera; indusiis nullis vel caducis.

MINDANAO, Surigao, ad terram umbrosam truncosque. *Bolster* 305.

A species with the aspect of *A. vastum* Bl., but differing in several details, besides the apparent absence of indusia.

SCHIZOLOMA Gaudich.

Schizoloma angustum Copel. sp. nov.

Rhizomate breve, repente, 3 mm. crasso, paleis minutis angustis castaneis vestito; stipitibus confertis, 3–8 cm. altis, 1–1.5 mm. crassis, atropurpureis, interdum flexuosis, deorsum pilis concoloribus 1.5 mm. longis sparsis vestitis, sursum rhachibusque triangularibus glabris, nitidis; fronde 10–18 cm. alta, ca. 1 cm. lata, pinnata; pinnis sessilibus basibus utrobique truncatis saepe super costam imbricatis, tandem deciduis, ellipticis, ca. 5 mm. latis, 4 mm. altis, rotundatis, integris, glabris, coriaceis, leviter convexis, infimis paullo remotis deflexis; venulis flabellatis, liberis, immersis; soro continuo, lato. (Tab. I B.)

PALAWAN, monte Victoria, ad saxa rivularia. *Foxworthy* 875.

Near to the next species, from which it differs most in the very broad bases of the pinnæ; except near the base of the frond, the rachis can not be seen from above, because of the overlapping pinnæ.

Schizoloma ovata (J. Sm.) *Lindsaya ovata* J. Sm. in Hook. Journ. Bot. **5:** 3; Spec. Fil. **1:** 204. *pl. 64 A.*

LUZON, *Cuming* 175, in herb. Bureau of Science; apparently not collected since Cuming's time. The figure in Species Filicum accurately represents our specimen.

Schizoloma jamesonioides (Baker) *Lindsaya jamesonioides* Baker in Journ. Bot. (1879) 39; Hooker, Icones Plant. III. **7:** *pl. 1626;* Christ in Ann. Jar. Bot. Buitenz. **15** (1898) 103.

Borneo and Celebes. Unknown in the Philippines.

Schizoloma fuligineum Copel. sp. nov.

Rhizomate repente, breve, 2–3 mm. crasso, paleis filiformibus badiis minutis vestito; stipitibus caespitosis, 7–10 cm. altis, pedibus paleaceis, aliter rhachibusque glabris, nitidis, castaneis; fronde 20–30 cm. alta, 2.5–3 cm. lata, sursum sensim angustata, pinnata, glabra; pinnis subsessilibus, ad rhachin articulatis, infimis deflexis, aliis horizontalibus, obtusis, integris, auriculatis auriculis interdum acutis, 12–16 mm. longis, 7–10 mm. latis, coriaceis, infra fuligineis, supra nigro-castaneis; venulis liberis. (Tab. I A.)

SURIGAO, Mindanao, ad terram siccam prope marem. *Bolster* 276.

Related rather to *Schizoloma guerinianum* Gaudich., than to *S. divergens* (Wall.) Diels, which has comparatively long and narrow pinnæ and pale foliage. The pinnæ are articulate to the rhachis, but rarely separate from it. About one pinna in ten shows an anastomosis of veinlets. It is smaller than *S. pellaciforme* (Christ) Christen. (*Lindsaya pellaciformis* Christ, Fil. Saras. 287; Ann. Jard. Bot. Buitenz. **15** (1898) 102. *pl. 14. f. 14.*), and has comparatively much deeper pinnæ.

ATHYRIUM Roth.

Athyrium hyalostegium Copel. sp. nov.

Rhizomate ad terram repente, plerumque intertexto, 1 mm. crasso, paleis minutis ferrugineis sparsis vestito; stipitibus caespitosis, 4–8 cm. altis, filiformibus, stramineis vel viridulis, pedes versus brunnescentibus, sursum rhachibusque pilis albis 0.3 mm. longis sericeis; fronde 3–7 cm. alta, 1.7–4 cm. lata, acuminata, bipinnata, pinnis ovatis obtusis infimis pinnatis, supremis integris coadunatis; pinnulis vel segmentis anguste oblongis, obtusis, plerumque integris, herbaceis, pilis albis 0.5 mm. longis sparsis pubescentibus; venulis simplicibus; indusiis tenuibus, setaceis, rarius aspleniiformibus, saepius curvis et utroque latere venulae fere aequaliter adnatis, i. e., nephrodiiformibus; sporangiis glabris.

LUZON, ad montem Mariveles, 1,350 m. s. m. *Copeland* 2033, *Merrill* 5186, eodem.

A distinct species, but of rather uncertain generic affinity. *Athyrium* seems to me the most natural place; but ferns I can not distinguish from *Nephrodium distans* (Don) Diels sometimes have athyrioid indusia.

Athyrium aristulatum Copel. sp. nov.

Rhizomate erecto, paleis cinnamomeis lanceolatis acuminatis 3 mm. longis basibusque stipitum dense obtecto; stipitibus caespitosis, ca. 20 cm. altis, gracilibus, basibus nigrescenti-stramineis paleaceis, sursum rhachibusque glabris viridulis; fronde 20–25 cm. alta, 10–13 cm. lata, acuminata, tripinnata; pinnis lanceolato-ovatis, brevi-stipitatis, plerumque acutis; pinnulis^{i} oblongis, obtusis, rhachibus anguste alatis; pinnulis^{ii} oblongis, obtusis vel truncatis, adnatis, serratis vel dentatis dentibus acutis plerumque aristulatis retroflexis, membranaceis, glabris, supra atro-viridibus, infra pallidioribus; soris costalibus, indusiis brevibus, latis, rectis vel curvis, albidis.

LUZON, monte Data, 2,200 m. s. m., ad terram umbrosam. *Copeland* 1880.

Athyrium aristulatum var. **sphagnicolum** Copel. var. nov.

Forma nana, stipitibus filiformibus 6–12 cm. altis, frondibus 5–10 cm. altis, bipinnatis.

Ibidem in apricis cum Sphagno. *Copeland* 1871.

A very distinct species, conspicuous in the field for the pubescent appearance of the upper surface, caused entirely by the very sharp, elevated or reflexed teeth.

Athyrium philippinense Christ. This plant was described (Bull. Herb. Boiss. **6** (1898) 154) as a variety of *A. Sarasinorum*, but Dr. Christ writes that he now regards it as specifically distinct.

DIPLAZIUM Swartz.

Diplazium Bolsteri Copel. sp. nov.

Rhizomate adscendente; stipitibus confertis, 5–10 cm. altis, gracilibus, pedibus nigris nigro-castaneo-paleaceis, sursum rhachibusque sordide viridibus, fere glabris; fronde 20–25 cm. alta, 3.5–5 cm. lata, acuminata, bipinnata, apice pinnatifida; pinnis infimis deflexis vix diminutis, aliis adscendenti-falcatis, stipitatis, basibus acroscopicis valde auriculatis, basiscopicis late excisis, 2–3 cm. longis, acuminatis, apicem versus acute serratis, rhachin versus incisis vel pinnatis, glabris, papyraceis, infra pallidis; venulis manifestis, sorisque perobliquis; indusiis angustis, castaneo-fulvis. (Tab. II.)

SURIGAO, Mindanao, ad terram umbrosam, 200 m. s. m. *Bolster* 264.

In the group of *D. Williamsi* and *D. Whitfordi*, more slender throughout than either, and well characterized by the acuminate, falcate pinnæ, prominent auricles, and very oblique sori.

ASPLENIUM Linn.

Asplenium exiguum Beddome. Fern. South. Ind. *Pl. 146.*

LUZON, Benguet, Adouay, *Copeland* 1845.

China and India.

Dr. Christ, who knows the type of *A. yunnanense* Franchet (Cf. Bull. Soc. Bot. Fr. IV **5** (1905) 53) regards my plant (1845) as intermediate between it and *A. exiguum*. My material seems on the whole to be nearer the latter; but it varies sufficiently fully to cover both, and Beddome's name is the older. I believe that this species includes also *A. Loherianum* Christ, though the rachis is usually glabrous.

Asplenium militare Copel. sp. nov.

Rhizomate ad terram repente, 1 mm. crasso, paleis murino-fuligineis lanceolatis acuminatis 5 mm. longis densissime vestito; stipitibus 40–50 cm. altis, validis, rhachibusque castaneis, nitidis, glabrescentibus; fronde 60–100 cm. alta, 25–30 cm. lata, pinnata cum impari; pinnis brevi-stipitatis, remotis, infimis vix diminutis, majoribus 15–18 cm. longis, 20–24 mm. latis, basibus inaequilateraliter cuneatis vel acroscopice truncatis, marginibus deorsum serratis sursum biserratis sinubus angustissimis, apicibus acuminatis in caudas productis, papyraceo coriaceis, glabris, infra olivaceis, supra potius fuligineis; venulis furcatis, angulo acuto orsis, patentibus; soris 10–12 mm. longis, curvis, costalibus.

MINDANAO, ad montem Apo, 1,800 m. s. m. *Copeland* 1505.

A very large representative of the *caudatum* group, with some resemblance to the American *A. Serra* L. et F.

Similar to this are some remarkable ferns collected in the same neighborhood by *De Vore* and *Hoover*, No. 321. There are three specimens in the material of this number which by themselves would seem to be as many distinct new species; in view of this probable mixture of species, it seems best to await another collection before describing any of them.

ADIANTUM Linn.

Adiantum opacum Copel. sp. nov.

Rhizomate breve, paleis angustissimis 4 mm. longis castaneis vestito; stipitibus confertis, 20 cm. altis, gracilibus, basibus pilis sparsis 6 mm. longis vestitis, dein glabris, sursum rhachibusque infra brevissime pubescentibus; fronde 16–20 cm. alta, ovata, tripinnata; pediculis pinnularum 1.5 mm. altis, persistentibus; pinnulis deciduis, plerumque dimidiatis, ca. 8 mm. altis, 10–12 mm. latis, glabris, pallidis, papyraceo-opacis; margine anguste cartilaginea, basiscopica plus minus recta integra, acroscopica rotundata in lobos 2–4 leviter crenata; venulis flabellatis, proximis, liberis; soro in lobo quoque uno, magno, 1.5–3 mm. lato, 1–1.5 mm. alto, nigro-fusco, sporangiis fere ad venulas restrictis. (Tab. III.)

PALAWAN, ad ripas fluminum. *Foxworthy* 869 (Iwahig), 874 (monte Victoria).

Near *A. pulchellum* Bl., but a smaller fern, with few large sori, and pinnules of different form.

PTERIS Linn.

Pteris Whitfordi Copel. sp. nov.

Species Pteridi quadriauritae qua segmentis angulo acuto, 30°–40°, costa orientibus, sinubus angustissimis fere vel usque ad costam attingentibus differt, affinis. Stipitibus confertis, 35–50 cm. altis, deorsum paleis laete castaneis 6 mm. longis lanceolatis vestitis; fronde 35 cm. plus minus alta, ovata; venulis conspicuis, glabris.

NEGROS, ad saxa prope fluminem Gimagan. *Whitford* 1660.

MONOGRAMMA Schk.

Monogramma (Pleurogramme) intermedia Copel. sp. nov.

Rhizomate erecto, gracile, basibus brunneis frondium dense obtecto; frondibus confertis, 4–6 cm. altis, 3–5 mm. latis, obtusis, deorsum sensim ad pedes sessiles angustatis, integris marginibus acieformibus, glabris, idioblastis in epidermide carentibus, coriaceis; costa supra sulca angusta notata; venulis immersis, occultis; soris continuis, medialibus, ad partem superiorem frondis restrictis, in sulcis 0.6 mm. altis marginem versus apertis immersis.

NEGROS, monte Silay, 1,000 m. s. m. *Whitford* 1503. Epiphytica.

A most distinct species. My disposition is to recognize Presl's *Pleurogramme* as a distinct genus.

POLYPODIUM Linn.

Polypodium Merritti Copel. sp. nov.

Rhizomate breve, repente, 2 mm. crasso, paleis 2 mm. longis lanceolatis glanduloso-ciliatis fulvo-ferrugineis vestito; stipitibus 1–2 cm. altis, non ad rhizomatem articulatis, tenuibus, frondeque tota pilis brevissimis hyalinis sparsis subglandulosis; fronde 10–17 cm. alta, ca. 1 cm. lata, vix sursum angustata, crasso-herbacea, fere ad rhachin pinnatifida; segmentis oblongis, plerumque obtusis, decurrenti-confluentibus, obtuse dentatis dentibus utroque latere 1–3; venulis simplicibus, inconspicuis, intra marginem evanescentibus; soris in segmento quoque 2–5, costalibus, orbicularibus, superficialibus, interdum confluentibus.

MINDORO, ad montem Halcon; de ramis muscosis pendente. *Merritt.*

A probable relative of *P. solidum* Mett., and *P. corticolum* C. Chr. (*P. glandulosum* Hook.); but longer, narrower, less coriaceous than the former and not glabrous; larger than the latter, and essentially different in the position of the sori, which are subterminal on the veinlets of *P. corticolum*, but basal on these of *P. Merritti.*

Polypodium (Phymatodes) Whitfordi Copel. sp. nov.

Rhizomate ad ramos repente, 1.5–2 mm. crasso, paleis pallide ferrugineis denique sordidis lanceolatis apiculatis 3 mm. longis persistentibus vestito; stipitibus remotis, filiformibus, frondis sterilis 10–35 mm., frondis fertilis 25–45 mm. altis, glabris; frondibus glabris, coriaceis, sterile 10–20 mm. longa suborbiculare, vel usque ad 35 mm. longa ovata, obtusa, margine angustissima cartilaginea incisula; costa infra nigra, venis primariis rectis, marginem fere attingentibus, venulis ca. 3 transversalibus connexis, venulis liberis inclusis paucis, excurrentibus; fronde fertile 20–60 mm. longa, 6–9 mm. lata, minoribus integris obtusis, majoribus crenatis acutis, basibus cuneatis; soris utroque latere uniseriatis, medialibus, subimmersis et supra prominulis, haud ad partem superiorem frondis restrictis. (Tab. IV B.)

LUZON, ad montem Mariveles, 1,300 m. s. m., ad ramos muscosos epiphyticum. *Copeland* 2032, *Merrill* 3244.

This is in the group of *P. neglectum* Bl., and *P. Nummularium* Mett. It may be the *P. rhynchophyllum* of Christ (Bull. Herb. Boiss. **6** (1898) 199) but not of Hooker Sp. Fil. **1**: 65. It is decidedly smaller than this Indian fern, with rather immersed sori not confined to the upper part of the frond, and larger areolæ with excurrent veinlets.

Polypodium Nummularium Mett. I am unable to distinguish *P. hammatisorum* Harrington. The plant is a *Phymatodes*, rather than a *Goniophlebium.*

Polypodium (Schellolepis) benguetense Copel. sp. nov. *P. mengtzeense* Copel. in Phil. Journ. Sc. **1** (1906) Suppl. 161. *Tab. 21,* non Christ in Bull. Herb. Boiss. **6** (1898) 869.

Rhizomate repente, 3 mm. crasso, paleis atro-fulvis 2 mm. longis lanceolatis acuminatis dense vestito; stipitibus ca. 15 cm. altis, rhachibusque plerumque stramineis, glabrescentibus; fronde 20–25 cm. alta, 12–20 cm. lata, pinnata; pinnis 1–2 cm. inter se remotis nec infimis multo remotioribus, plerumque oppositis, sessilibus, supremis distinctis neque decurrentibus nec multis adnatis, subcordatis vel hastato-dilatatis, acuminatis, acute serratis, membranaceis, glabris; costa prominente, venis inconspicuis, seriem unam areolarum, interdum alteram minorum efficientibus; soris subimmersis.

LUZON, Benguet, Ambuklao, 750 m. s. m., ad terram. *Copeland* 1892 Typus.

This species was prepared for publication in my preceding paper; but, after the galley proof was corrected, I received a letter from Dr. Christ identifying *Elmer's* 6406 as *P. mengtzeense.* Having only the description of *P. mengtzeense,*

but no specimens, I could not do otherwise than accept the determination. He now regards my plants as distinct. Judging by the description, the two species are very different, *P. mengtzeense* being related rather to *P. argutum*.

Polypodium (Selliguea) Bolsteri Copel. sp. nov.

Rhizomate late repente, 2–3 mm. crasso, paleis, subatris aculeato-ovatis 2–3 mm. longis vestito, denique nudo; frondibus sparsis, sessilibus vel brevi-stipitatis, 20–30 cm. longis, 1–2 cm. latis, utrinque sensim attenuatis, integris, glabris, membranaceis; venis primariis flexuosis, marginem vix attingentibus, venatione tenuiore irregulare, venulis liberis inclusis; soris irregularibus, elongatis vel in seriebus solitariis instructis, venis primariis parallelibus. (Tab. IV A.)

MINDANAO, Surigao. *Bolster* s. n.

Different from *P. Selliguea* in the almost sessile fronds, irregular areolæ, and short sori.

Polypodium (Selliguea) Feei Mett.

MINDANAO, Prov. of Surigao. *Bolster* 337.

Java.

GLEICHENIA Sm.

Gleichenia dolosa Copel. nom. nov. (*Dicranopteris dolosa* Copeland in Perkins's Fragmenta Fl. Philip. (1905) 193.)

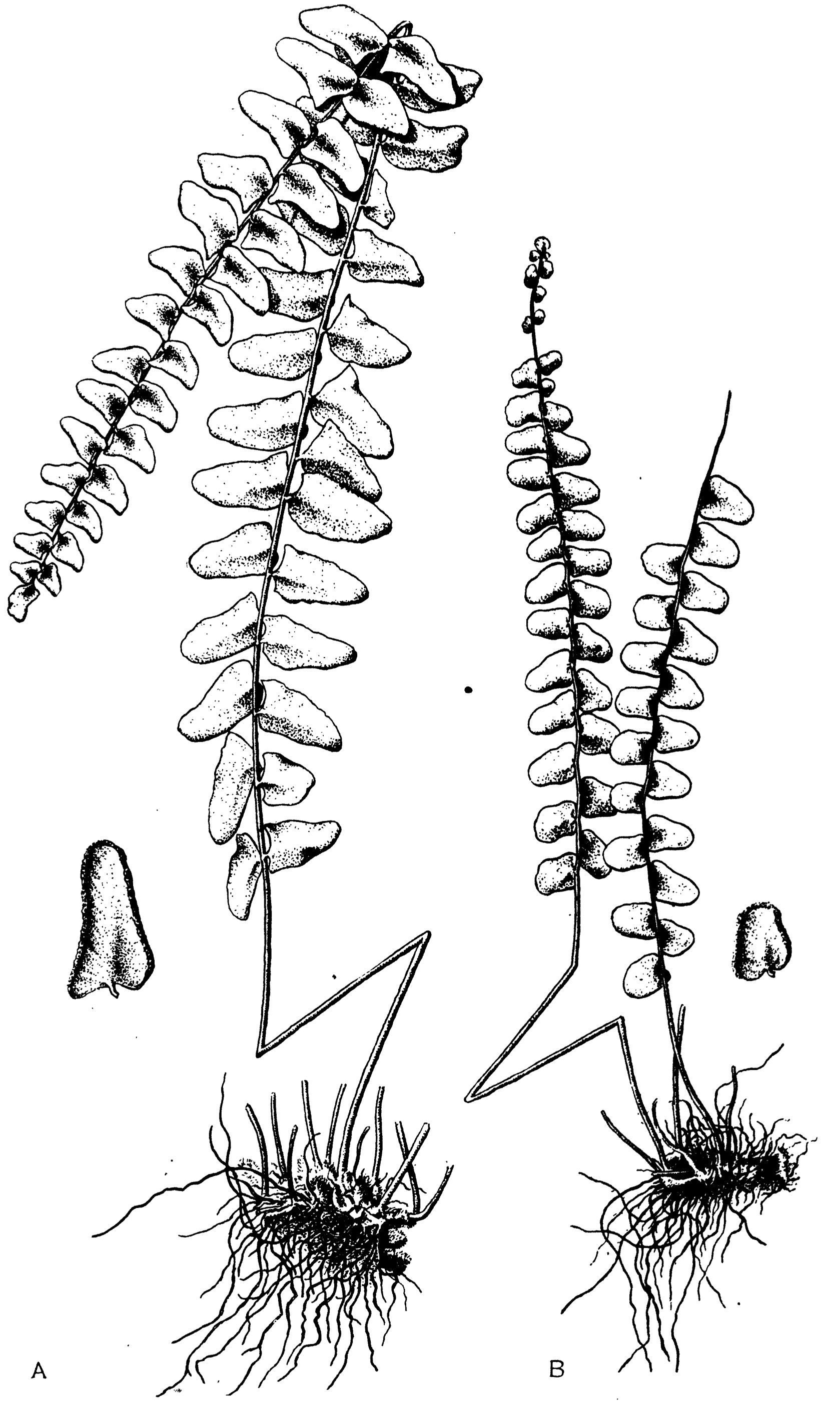
Gleichenia crassifolia (Presl) Copel. (*Mertensia crassifolia* Presl in Epim. Bot. p. 23, *Tab. 13.*)

This has been treated as a form of *G. linearis*, but seems to me to have very sufficient specific characters. Our specimens are from Mount Apo, MINDANAO; *Copeland* 1160, 1458, *De Vore* and *Hoover* 342.

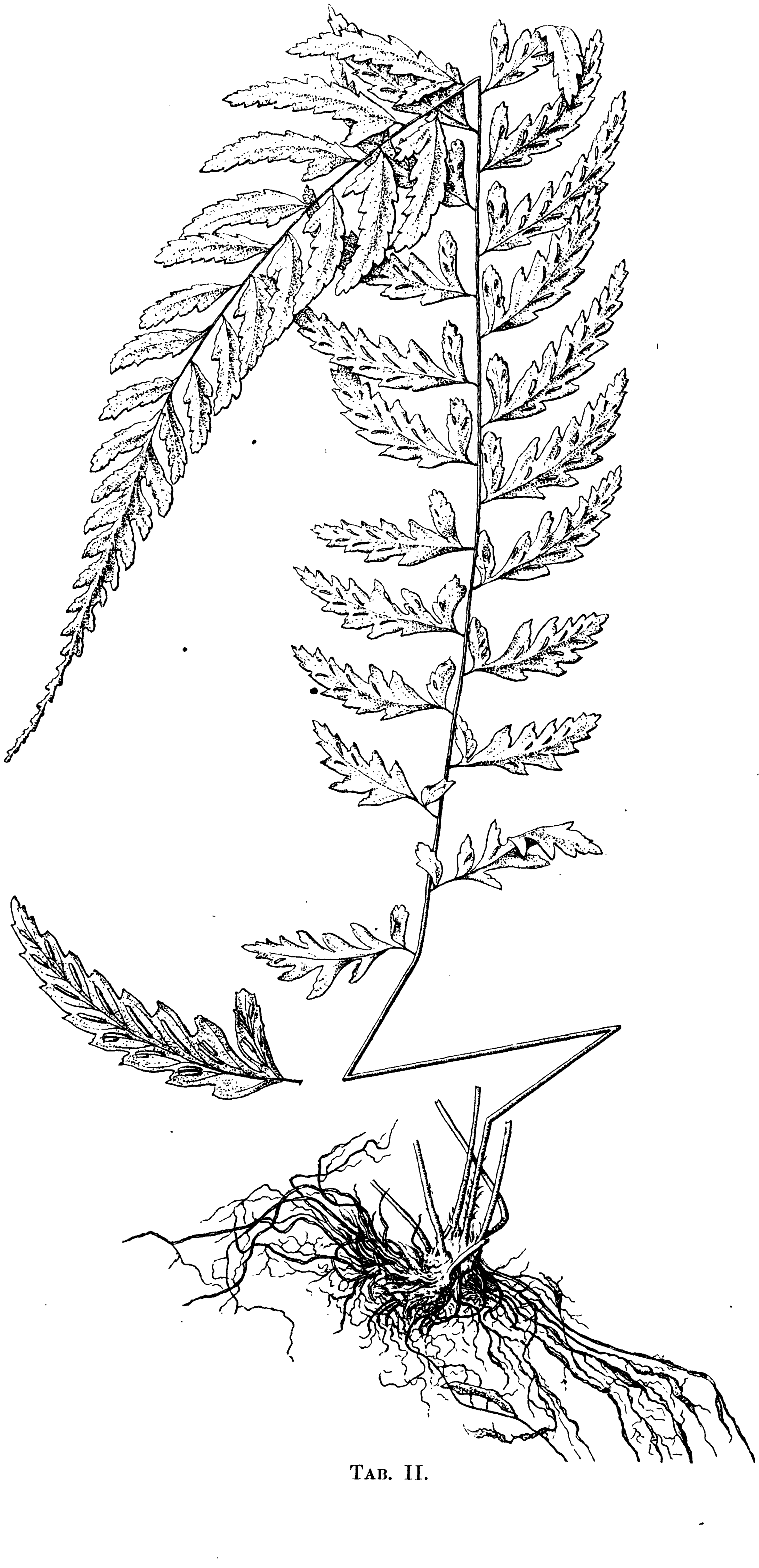
LIST OF PLATES.

(All drawings by Hugo Navarro, natural size.)

Tab. I. A, *Schizoloma fuligineum* Copel.
B, *Schizoloma angustum* Copel.
II. *Diplazium Bolsteri* Copel.
III. *Adiantum opacum* Copel.
IV. A, *Polypodium Bolsteri* Copel.
B, *Polypodium Whitfordi* Copel.



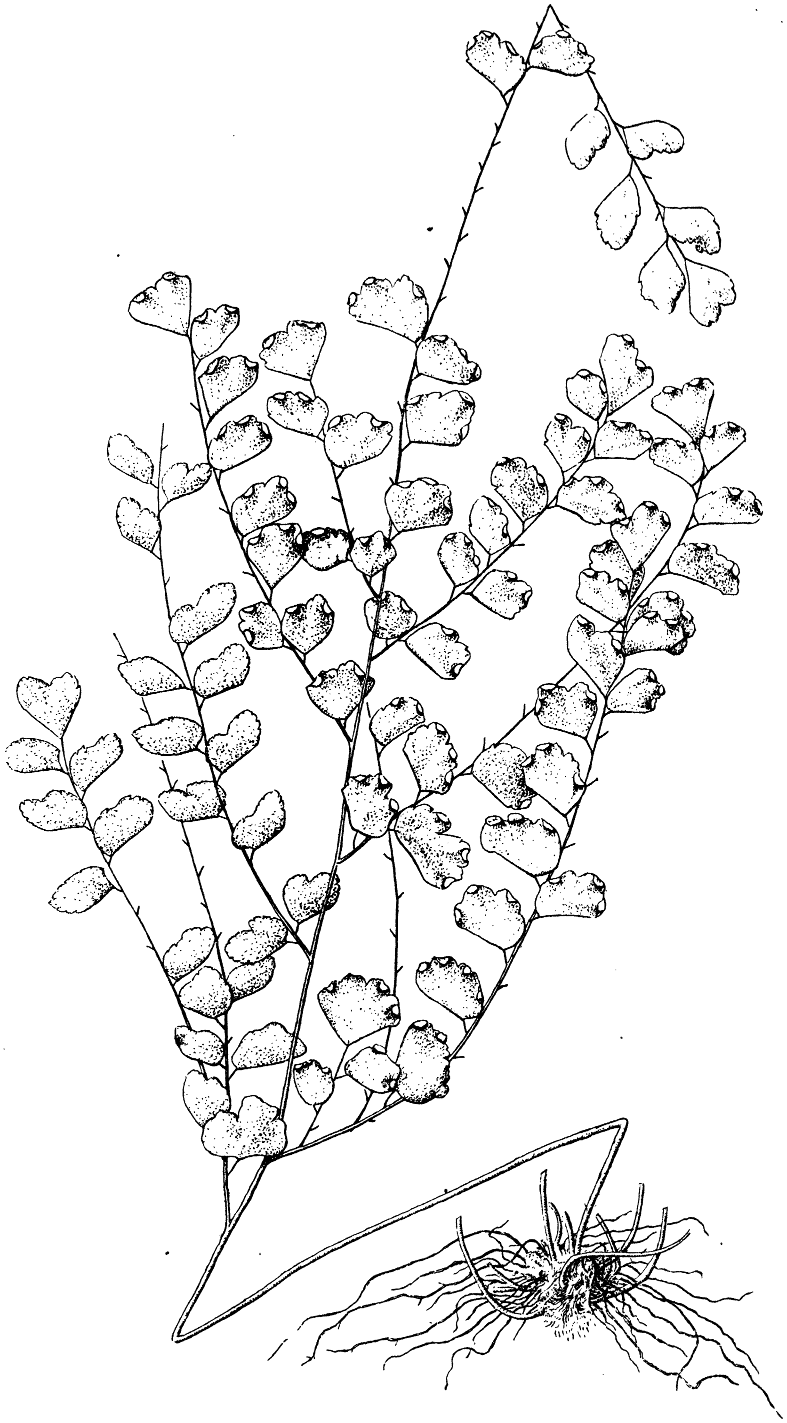
TAB. I.



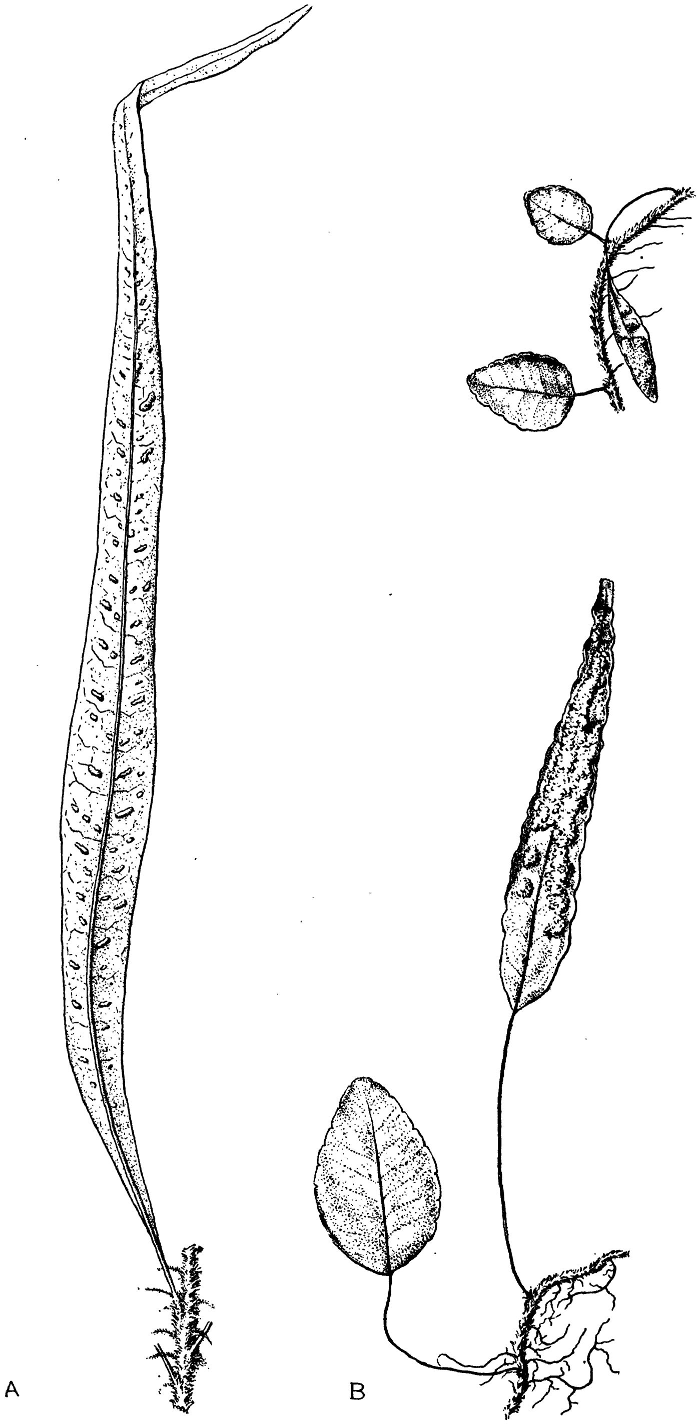
TAB. II.

COPELAND: NEW PHILIPPINE FERNS, II.

PHIL. JOURN. SCI., VOL. I, SUPP. IV, SEPTEMBER 15, 1906.



TAB. III.



TAB. IV.

NOTES ON PHILIPPINE GRAMINEÆ, II.

By E. HACKEL.
(*Graz, Austria.*)

The present article, as was the case with the preceding paper published under this title,[1] has been compiled from notes and identifications submitted by Dr. Hackel, the material having been supplied to him in part for identification and in part for verification of my own determinations. In the present short paper, including the species and varieties described as new, 29 species and varieties and 4 genera are added to the Philippine flora, with one exception, all from a collection made in less than a month's time in the highlands of Benguet and Lepanto, Northern Luzon. The very striking character of the collection, other than such more or less characteristic northern types as *Pollinia nuda* Trin., *P. imberbis* var. *Willdenowiana* forma *monostachya* Hack., *Arthraxon ciliaris* Beauv., varieties, *A. microphyllus* Hochst., *Panicum pedicellare* Hack., *P. villosum* Lam., *Calamagrostis arundinacea* Roth, var. *nipponica* Hack., and *Brachypodium silvaticum* Beauv., is the presence of a series of distinct southern or Australian types, such as *Chionachne biaurita* Hack., *Pollinia irritans* Benth., *Andropogon Baileyi* F. Muell., *A. fragilis* R. Br., var. *luzoniensis* Hack., *A. filipendulus* Hochst., var. *lachnatherus* Hack., *Ischaemum arundinaceum* F. Muell., var. *radicans* Hack., and *Microlaena stipoides* R. Br.—(E. D. M.)

CHIONACHNE R. Br.

Chionachne biaurita Hack. sp. nov.

Annua. Culmus erectus 4–5 dm. altus robustus plurinodis, ex omnibus nodis ramos floriferos saepius binos elongatos ramulosos subfastigiatos procreans, semiteres, canaliculatus, glaberrimus. Vaginae internodiis multo breviores, laxae, compressae, pilis rigidis basi grosse tuberculatis hirsutae v. solis tuberculis scabrae. Ligula series ciliorum brevium. Laminae e basi angustata lineari-lanceolatae acutae, 12–24 cm. longae, ad 10 mm. latae, flaccidulae, virides, praeter margines superne scabras glaberrimae vel pilis paucis adspersae, tenuinerves. Spicae in apice ramorum

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[1] *Publications of the Bureau of Government Laboratories*, Manila (1906), No. 35, 79–82.

ramulorumque tenui-filiformium 10–15 cm. longorum vel in axillis foliorum inferiorum solitariae, binae v. ternae, breviter pedunculatae, vagina ventricosa folii fulcientis velut spatha communi maxima parte obvolutae, singulae, singula spatha subventricosa laminam brevissimam gerente pedunculam aequante v. superante, circ. 2 cm. longa, glabra, viridi fultae, lineares, a dorso subcompressae, 1.5–2 cm. longae, pallide virides, spiculis ♀ sessilibus circ. 4 in simplici serie superpositis et ternione terminali spicularum mascularum constantes. Rhacheos articuli spiculam ♀ subaequantes v.ea $\frac{1}{3}$ breviores, late clavati, praeter basim pilosulam glaberrimi, inanes, oblique secedentes. Spiculae foemineae 2 inferiores solitariae, adjecto pedicello sterili brevi rhacheos articulo basi adnato; spiculis ♀ duabus superioribus adstat singula spicula ♂ vel neutra pedicellata; terminatur spica spicula ♂ pedicellata cujus pedicelli basi insidet spicula ♂ sessilis et adstat altera spicula ♂ pedicellata. Spiculae foemineae: gluma I oblonga, apice late biaurita, auriculis semiovatis acutiusculis antice denticulatis ciliolatis subherbaceis nervis reticulatis viridibus percursis, patentibus, in anguli interioris marginibus costa alba notatis, marginibus exterioribus inflexis, cum callo 1.5 mm. longo obtusissimo glabro et cum auriculis 3 mm. longis 7–7.5 mm. longa, dorso subconvexo chartaceo albido glaberrimo multinervis, lateribus inflexis papilloso-scaberula. Gluma II I^{am} sine auriculis aequans (4.5 mm. lg.) ovata, subito acuminata, chartacea, plana, nervo medio prominente, marginibus inflexis, glaberrima, 7–5-nervis. Gluma III II^{am} aequans, ovato-oblonga breviter acuminata membranacea tenuissime 3-nervis glabra, scabra, vacua; IV III^{ae} simillima, ejus palea anguste linearis, bidentula. Caryopsis late oblonga, a dorso compressa pallida, 2.5 mm. longa, basi emarginata, embryone caryopseos $\frac{3}{4}$ aequante, macula hilari valde depressa atroviolacea. Spiculae musculae lanceolatae, 5 mm. longae, pallidae, viridi-striatae, glaberrimae, pedicellis glaberrimis tenuibus (non clavatis) fultae (biflorae ?); gluma I lanceolata, acutiuscula, planiuscula, 7–9-nervis; II I^{am} aequans, lanceolata acuminata 3-nervis; III hyalina cum palea (et flore ♂ ?); IV ei simillima, palea binervis. Stamina 3; antheris 3 mm. longis.

LUZON, Benguet, ad flumen Bued (4282 *Merrill*) October 22, 1905, 1,000 m. s. m. Species peculiaris, ab omnibus hujus generis notis valde diversa spiculis masculis ad ternionem terminalem et duas quae spiculas foemineas superiores comitantur redactis, spiculae fœmineae gluma 1 apice late biaurita.

IMPERATA Cyr.

Imperata exaltata Brongn. subsp. **Merrillii** Hack. subspec. nov.

Differt a typo laminis innovationum angustis subconvolutis, panicula brevi densissima, racemis floriferis ex ipsa rhachi communi paniculae enascentibus.

LUZON, Province of Benguet, Mount Tonglon (Santo Tomas), (4813 *Merrill*) November 12, 1905. Open places at about 2,200 m.

Typical *Imperata exaltata* Brongn. (*Cuming* 1801, 2411) is a very tall grass with broad, flat leaves, pyramidal, somewhat loose panicles, the flowering racemes being born on branchlets of the second or third degree; the primary branches are up to 10 or 12 cm. long dividing into secondary branchlets and the secondary into tertiary which are the flowering racemes. The structure of the spikelets in both typical *Imperata exaltata* and the subsp. *Merrillii* is identical and the culms are hollow in both, but solid in all other species of the genus. The form here described is probably one developed in the high mountains.

POLLINIA Trin.

Pollinia nuda Trin. in Mém. Acad. Pétersb. VI. **2** (1833) 307; Hack. in DC. Monog. Phan. **6** (1889) 178; Rendle in Journ. Linn. Soc. Bot. **36** (1904) 356.

LUZON, Province of Benguet, Pauai (4727 *Merrill*) November 8, 1905; Mount Tonglon (4842 *Merrill*) November 12, 1905. Thickets and open places 2,000 to 2,200 m. Not previously reported from the Philippines. Japan to the Luchu Archipelago, China, northern India, and South Africa.

Pollinia imberbis Nees, β **Willdenowiana** Hack. l. c. 178, forma **monostachya** (Franch. et Sav.). *Pollinia japonica* var. *monostachya* Franch. et Sav.

LUZON, Province of Benguet, Pauai (4707 *Merrill*) November 8, 1905. In open thickets at about 2,100 m. The variety from Japan to southern China, northern India and Java, the form from Japan.

Pollinia irritans Benth. Fl. Austr. **7** (1878) 525; Hack. l. c. 155.

LUZON, Province of Benguet, Ambuklao to Daklan (4388 *Merrill*) October 25, 1905. In open grass lands at about 1,000 m. Previously known only from Australia (Queensland).

Pollinia argentea Trin. var. **lagopus** Hack. in Govt. Lab. Publ. **35** (1906) 79.

This variety has been re-collected at the type locality, Mount Arayat (4222 *Merrill*) September, 1905, and also in Northern Luzon: Province of Benguet, Baguio, to Ambuklao (4365 *Merrill*) October 24, 1905; District of Lepanto, Mount Data (4535 *Merrill*) November, 1905, ascending to 2,100 m.

ROTTBOELLIA Linn. f.

Rottboellia ophiuroides Benth. var. **intermedia** Hack. var. nov.

Differt a typo gluma I supra medium tantum anguste alata, in typo a $\frac{1}{4}$ inferiore latius alata, ala sursum dilatata. Vergit ad *R. striatam* Nees.

LUZON, Province of Benguet, Bugias (4667 *Merrill*) October 28, 1905; Baguio (6393 *Elmer*) May, 1904. Intermediate between *R. ophiuroides* and *R. striata*, but nearer the former.

ARTHRAXON Beauv.

Arthraxon microphyllus Hochst. in Flora **39** (1856) 188; Hack. l. c. 351, var. **genuinus** Hack. l. c. 352.

LUZON, Province of Benguet, Baguio to Ambuklao (4363 *Merrill*) October, 1905; Suyoc to Pauai (4719 *Merrill*) November 7, 1905; District of Lepanto, Mount Data (4485 *Merrill*) November 4, 1905. On dry and damp banks, 1,800 to 2,100 m. British India to Burma, Tonkin, Ceylon, and Abyssinia. Not previously reported from the Philipppines and not known from Malaya.

Arthraxon ciliaris Beauv., subsp. **Langsdorffii** Hack. l. c. 354.

LUZON, District of Lepanto, Mount Data (4628 *Merrill*) November 5, 1905. In open wet lands at 1,600 m. Japan and China.

Arthraxon ciliaris Beauv., subsp. **nudus** Hack. l. c. 356.

LUZON, Province of Benguet, Kabayan (4427 *Merrill*) October 27, 1905. British India.

Arthraxon ciliaris Beauv. subsp. **Quartinianus** Hack. l. c. 356.

LUZON, Province of Benguet, Bued River, Bugias and Pauai to Baguio (4272, 4677, 4704 *Merrill*) October, November, 1905. British India and tropical Africa.

ISCHAEMUM Linn.

Ischaemum arundinaceum F. Muell. var. **radicans** Hack. var. nov.

Differt a typo (australiensi) culmo in parte inferiore decumbente e nodis radicante graciliore, foliis, racemis, spiculis minoribus, rhacheos articulis breviter ciliatis, gluma I distinctius reticulato-nervosa.

LUZON, Province of Benguet, Baguio (4264 *Merrill*) October 22, 1905. Abundant on banks and slopes in the pine region at about 1,500 m.

The type of this species is a tall, erect grass 1 meter high, somewhat larger in all its parts than the variety here described, but the structure of the spikelets in both is essentially the same. In the type the nerves of glume I anastomose only in the upper part.

Ischaemum Merrillii Hack. sp. nov.

Perenne. Culmi erecti, graciles, circ. 4 dm. alti, teretiusculi, glaberrimi, multinodes, nodis pluribus in culmi basi confertis additis 3 superioribus plus minus remotis, summo supra medium culmi sito, simplices vel ramulo foliifero aucti. Vaginae superiores internodiis breviores, inferiores iis longiores, subcompressae, superiores subcarinatae, secus marginem exteriorem et prope os pilis adspersae, ceteram glaberrimae. Ligula membranacea ovato-oblonga obtusa in vaginam decurrens, 2.5–4 mm. longa, nervosa, ciliis parcis longis pilisque dorsalibus vestita. Laminae lineari-lanceolatae basi subito in petiolum subdistinctum (in foliis inferioribus 1.5 cm., in superioribus 0.5 cm. longum) angustatae, tenuissime acuminatae, 5–8 cm. (summa 1–2 cm.) longae, 6–8 mm. latae, patentes v. patentissimae, rigidulae, virides, utrinque (praesertim subtus) pilis tenuibus basi tuberculatis parce conspersae, marginibus scabrae, tenuinerves. Racemi in apice culmi bini sibi appressi, alter sessilis alter pedunculo circ. 5 mm. longo fultus, circ. 5 cm. longi, 4 mm. lati, densiflori; rhacheos articuli spiculam dimidiam paullo superantes, crassi, trigoni, utroque margine pilis brevibus (articulo 3–4-plo brevioribus) suberectis rigidulis albidis ciliati, margine interiore fere rectilinei. Spiculae sessiles obovato-oblongae, cum callo 1.5 mm. longo obtuso breviter parceque barbato 7 mm. longae, 2 mm. latae, livide violascentes. Gluma I obtuse bidentula, marginibus anguste inflexis, flexuris non alatis, chartacea, in $\frac{1}{3}$ inferiore subcoriacea, praeter nervos flexurales 6-nervis, nervis fere ad apicem productis non anastomosantibus, dorso plano saltem superne scaberula; II I^{am} aequans, ovata, acute carinata, apice obtusiusculo latere compressa, subchartacea, 5-nervis, superne scabra; III quam I paullo brevior, ovato-lanceolata acuta hyalina glabra 3-nervis; ejus palea lanceolata acuta, binervis; IV III^{am} aequans, elliptica, in $\frac{1}{3}$ superiore bifida, glabra, e sinu emittens aristam perfectam circ. 12 mm. longam, cujus columna glaberrima quam subula $\frac{1}{3}$ brevior est. Palea gluman aequans, ovato-lanceolata, acuta integra enervis. Spiculae pedicellatae pedicellis circ. 4 mm. longis articulis simillimis sed obtuse trigonis fultae, suboblique lanceolatae, circ. 6 mm. longae, violascentes; gluma I acuta integra marginibus anguste inflexa flexura interiore a basi ad apicem anguste alata, exteriore anguste marginata, 7-nervis, scaberula; II et III ut in spiculis sessilibus; IV, integra mutica acutiuscula, 3-nervis, flore inf. ♂, superiore ☿.

LUZON, Lepanto, monte Data (Balili). In locis apertis udis, 1,500 m. s. m. (4622 *Merrill*) November, 1905.

Affinis *I. arundinaceo* F. Muell., quod differt ligula brevi glabra, laminis basi angustatis quidem sed non petiolatis, racemosum articulis longius ciliatis et imprimis gluma I spiculae sessilis in $\frac{1}{2}$ superiore utrinque distincte alata nervis 5 infra apicem evanidis superne reticulatim anastomosantibus percursa.

ANDROPOGON Linn.

Andropogon fastigiatus Sw.; Hack. l. c. 393.

LUZON, District of Lepanto, Cervantes to Balili (4461 *Merrill*) November 3, 1906. Dry open grassy slopes at about 1,000 m. Not previously reported from the Philippines. Tropical America, Asia, and Africa.

Andropogon fragilis R. Br. var. **luzoniensis** Hack. var. nov.

Differt a typo gluma I in spicula ☿ hirtula, pedicello spiculae tabescentis glabro.

LUZON, Province of Benguet, Ambuklao to Daklan (4386 *Merrill*) October 25, 1905; District of Lepanto, Cervantes to Mancayan (4468 *Merrill*) November 3, 1905.

The species is known only from Australia.

Andropogon micranthus Kunth, var. **spicigerus** Hack. l. c. 489.

LUZON, Province of Benguet, Mount Tonglon (4836 *Merrill*) November 12, 1905; Baguio (5918 *Elmer*) March, 1904. This variety has not previously been reported from the Philippines. Southern China to Australia and New Caledonia.

Andropogon Baileyi F. Muell. in Victorian Naturalist 7 (1891) 16. *Sorghum laxiflorum* Bailey.

LUZON, Province of Benguet, Ambuklao to Daklan (4399 *Merrill*) October 25, 1905.

A very rare Australian species, the Luzon plant agreeing with the cotype of the species.

Andropogon filipendulus Hochst. var. **lachnatherus** Hack. l. c. 635.

LUZON, Province of Benguet, Ambuklao to Daklan (4398 *Merrill*) October 25, 1905. Queensland and New South Wales.

Andropogon filipendulus Hochst. var. **lachnatherus** Hack., forma **bispiculata** Hack.

Racemo utroque spiculas ☿ duas continente.

LUZON, Province of Benguet, Bued River (4298 *Merrill*) November 14, 1905. In true var. *lanchnatherus* the longer peduncled raceme has only one ☿ spikelet.

Andropogon leptos Steud. Synopsis **1** (1855) 397; Hack. in DC. Monog. Phan. **6** (1889) 537.

LUZON, Province of Benguet, Bued River (4322 *Merrill*) November 14, 1905.

A very important find, this species having become almost obsolete, being known only from a single specimen, the collector being unknown, the place of collection being indicated only by the word "Andor," which I have been unable to locate. I would have guessed it to be in E. India, but Hooker does not enumerate the species in his Flora of British India. ["Andor" is apparently not a Philippine locality.—E. D. M.]

ARUNDINELLA Raddi.

Arundinella agrostoides Trin. var. **ciliata** Hook. f. Fl. Brit. Ind. **7** (1897) 71.

LUZON, Province of Benguet, Baguio (4328 *Merrill*) October, 1905. This variety was previously known from British India.

ISACHNE R. Br.

Isachne debilis Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 322.

LUZON, Province of Benguet, Kabayan (4431 *Merrill*) October 27, 1905; Mindanao, Mount Apo (355 *De Vore & Hoover*) May, 1903.

Isachne debilis Rendle, var. **incrassata** Hack. var. nov.

Differt a typo foliis lieneari-lanceolatis marginibus incrassatis.

MINDANAO, District of Davao, Mount Apo (358 *DeVore & Hoover*) May, 1903.

Isachne monticola Büse, forma.

LUZON, Province of Benguet, Pauai (4709 *Merrill*) November 8, 1905; District of Lepanto, Mount Data (4626 *Merrill*) November 5, 1905. I am now of the opinion that these plants correspond better with the description of *Isachne monticola* than those previously so determined.[2]

PANICUM Linn.

Panicum pedicellare (Trin.). *Paspalum pedicellare* Trin. ex Steud. Nomen. ed. II **2** (1841) 272; Hook. f. Fl. Brit. Ind. **7** (1897), 19.

LUZON, Province of Bataan, Lamao River (3164 *Merrill*) October, 1903; Province of Pampanga, Mount Arayat (4225 *Merrill*) September, 1905. Not previously reported from the Philippines. British India and Burma.

Panicum Crus-galli Linn. var. **muticum** Doell.

LUZON, Province of Benguet, Bued River (4307 *Merrill*) November 14, 1905. Widely distributed in tropical and temperate regions.

Panicum nodosum Kunth Enum. Pl. **1** (1833) 97. *Panicum multinode* Presl, Rel. Haenk. **1** (1830) 303, non Lam. 1797. *Panicum ouonbiense* Balansa in Morot, Journ. de Bot. **4** (1890) 141; Mez in Perk. Frag. Fl. Philip. (1904) 143.

LUZON, Province of Nueva Vizcaya, Quiangan (127 *Merrill*) June, 1902; Caraballo Sur Mountains (255 *Merrill*) May, 1902; Province of Pampanga, Arayat (4228 *Merrill*) September, 1905; Province of Cavite, Maragondong (4182 *Merrill*) July, 1905; Province of Bataan, Lamao River (533 *Whitford*) July, 1904; Province of Tayabas, Atimonan (135 *Gregory*) August, 1904. SIBUYAN (13 *McGregor*) July, 1904. CULION (527 *Merrill*) December, 1902.

Balansa in distinguishing *Panicum ouonbiense* from *P. nodosum* Kunth (*P. multinode* Presl, non Lam.) took for the type of Kunth's species the East Indian form (*P. Arnottianum* Nees) most common in European herbaria. Kunth's *Panicum nodosum* was, however, based on Presl's *Panicum multinode*, the type being from Luzon, and moreover both Presl's and Kunth's diagnoses apply to the Philippine material cited above. I am of the opinion that Haenke's Luzon plant, the type of *P. nodosum* is identical with the material cited above and with Balansa's Cochin China material, and that therefore to this form belongs the name *Panicum nodosum typicum*, and to the Indian plant the name *P. Arnottianum* as a species or variety.

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[2] *Publications of the Bureau of Government Laboratories*, Manila (1906), No. **35**, 79.

Panicum villosum Lam. Illustr. 1 (1791) 173; Hook. f. Fl. Brit. Ind. **7** (1897) 34.

LUZON, Province of Benguet, Baguio to Ambuklao (4360 *Merrill*) October 24, 1905. Not previously reported from the Philippines. British India to Ceylon and China. A low form, the culm not naked below the panicle as in the typical form.

MICROLAENA R. Br.

Microlaena stipoides R. Br. Prodr. (1810) 210; Benth. Fl. Austr. **7** (1878) 552.

LUZON, Province of Benguet, Mount Tonglon (4831 *Merrill*) November 12, 1905; Pauai to Baguio (4696 *Merrill*) November 9, 1905; District of Lepanto, Mount Data (4543 *Merrill*) November, 1905. The first two numbers cited were found on dry, open, grassy slopes and ridges at about 1,700 m., the last in wet, grassy and sphagnum borders of a small lake at 2,200 m. Australia and New Zealand. The five known species of this genus have previously been known only from Australia and New Zealand, the present species being the first one to be found north of Australia.

SPOROBOLUS R. Br.

Sporobolus ciliatus Presl, Rel. Haenk. **1** (1830) 242. *Sporobolus piliferus* Kunth, Enum. **1** (1833) 211, var. α (excl. var. β); Hook. f. Fl. Brit. Ind. **7** (1897) 251.

LUZON, Province of Benguet, Baguio to Ambuklao (4362 *Merrill*) October 24, 1905; Suyoc to Pauai (4718 *Merrill*) November 7, 1905. On dry banks and in open grass lands, 1,500 to 2,100 m. Not previously reported from the Philippines. Tropical Asia and America.

CALAMAGROSTIS Roth.

Calamagrostis arundinacea Roth., var. **nipponica** Hack. in Bull. Herb. Boiss. **7** (1899) 652. *Calamagrostis nipponica* Fr. & Sav.

LUZON, Province of Benguet, Pauai to Baguio (4679, 4701 *Merrill*) November 9, 1905; District of Lepanto, Mount Data (4564 *Merrill*) November 4, 1905. Not quite identical with the var. *nipponica* from Japan, but the differences are very slight. The species widely distributed in Japan and Asia, the variety in Japan.

BRACHYPODIUM Beauv.

Brachypodium silvaticum Beauv., subsp. **luzoniense,** subsp. nov. (vel. spec. propr.?) Differt a typo omnibus partibus glaberrimum.

LUZON, Province of Benguet, Pauai (4710 *Merrill*) November 8, 1905; Mount Tonglon (4830 *Merrill*) November 12, 1905; District of Lepanto, Mount Data (4536 *Merrill*) November, 1905.

Brachypodium silvaticum Beauv., var. **asperum** var. nov.

Differt a typo culmo aspero.

LUZON, Province of Benguet, Pauai to Baguio (4698 *Merrill*) November 9, 1905.

Brachypodium silvaticum Beauv., is a highly variable species widely distributed in Japan, North Asia, the mountains of India, and Europe. No representative of the genus having previously been discovered in the Philippines.

MYRSINACEÆ NOVÆ PHILIPPINENSES.

By C. MEZ.
(*University of Halle, Halle, Germany.*)

MAESA Forsk.

Maesa Elmeri Mez sp. nov.

Foliis glaberrimis, ovato-ellipticis vel ellipticis, basi brevissime acutis vel subrotundatis, apice breviter lateque acutiusculis, margine dense subgrosseque crenatis, haud reticulatis vero dorso lineis ∞ brevibus nervelliformi-anastomosantibus glandulosis praeditis, punctis prominentibus destitutis; inflorescentiis plane axillaribus nec e ramulis abbreviatis prodeuntibus, bene compositis, per anthesin quam petioli brevioribus; prophyllis parvis; sepalis rotundatis, lineatis, margine integerrimis nudisque, dorso haud lepidotis; petalis ad ½ longit. connatis, lobis rotundatis, lineatis; staminibus petalis alte insertis, filamentis quam antherae brevioribus; stylo laevi; placenta multiovulata.

Erecta vel subscandens (ex cl. *Elmer*!); ramulis validis, novellis minutissime perobscureque pilosis, adultis castaneis denseque lenticellis pallidis verruculosis obtectis. Folia petiolis gracillimis usque ad 40 mm. longis mihi visis stipitata, ± 0.1 m. longa et 55 mm. lata, chartacea, fère opaca. Inflorescentiae submultiflorae, dense 2-pinnatim panniculatae, primum valde abbreviatae vix ultra 20 mm. longae demum fructiferae auctae usque ad 80 mm. metientes petiolosque tunc satis superantes, glaberrimae, e spicis densis, per anthesin vix ultra 10 mm. longis compositae; bracteis minutis, lanceolato-triangularibus, pedicellos vix 0.5 mm. longos subaequantibus. Flores albidae (ex cl. collectore!) 2 mm. longi. Baccae depresse vel perfecte globosae, leaves, haud maculatae, usque ad 3.5 mm. diam. metientes.

LUZON, prov. Benguet prope Baguio, Martio florifera fructiferaque (5925 *Elmer*).

Obs. Maesae Hernschcimianae Warb., satis accedit, sed foliorum forma lineisque nec non inflorentiis haud e ramulis abbreviatis prodeuntibus differt.

ARDISIA Swartz.

Ardisia Whitfordii Mez sp. nov.

Frutex foliis late lanceolatis, apice optime acutissimeque acuminatis, integerrimis, glandulis marginalibus magnis albuminiferis destitutis; inflorescentiis in ramulorum specialium apice foliis comatim pseudoverticillatis suffultis, multifloris; pedicellis (fructiferis) usque ad 17 mm. longis; sepalis liberis, margine dense papilloso-fimbriatis, multipunctatis.

Frutex usque ad 5-metralis (ex cl. *Whitford*!) ramulis gracilibus, brunneis, glabris. Folia (non nisi comae infra inflorescentiam cognita) petiolis ± 12 mm. longis, basi bene pulvinatis stipitata, ± 0.2 m. longa et 43 mm. lata, chartacea, glaberrima, sicca glauco-viridia subtus pallidiora, basi sensim acutissima, utrinque dense prominulo-reticulata, punctis prominentibus viridibus dissitis aucta. Inflorescentia fructifera tantum cognita absque dubio multiflora, pyramidata, folia superans, 2-pinnatim panniculata; ramulis patentibus, ad apicem flores multos dense racemosos gerentibus. Sepala acuta. Fructus (num siccus?) paullo depresse globosus, alutaceus, glaber laevisque, ± 10 mm. diam. metiens.

LUZON, prov. Tayabas, Septembri fructifera (772 *Whitford*).

Obs. Omnibus notis *Ardisiae Perrottetianae* A. DC., maxime affinis videtur, foliorum forma tamen abunde distincta.

Ardisia Copelandii Mez sp. nov.

Arbor ramulis novellis glaberrimis; foliis glabris, integerrimis, glandulis marginalibus destitutis; inflorescentiis e foliorum normalium axillis provenientibus, 2-pinnatim panniculatis, ramulis flores subumbellatos gerentibus; pedicellis longissimis; sepalis per anthesin apertis, glabris, subtriangularibus, punctatis; petalis valde tegentibus, punctatis, acuminatis; filamentis subnullis; antheris maximis, triangularibus, sensim acutis, dorso in parte superiore punctatis.

Arbor 10-metralis (ex cl. *Copeland*!) ramulis crassis. Folia petiolis 13 mm. longis, latissimis et a lamina parum distinctis, haud canaliculatis stipitata, anguste elliptica, basi brevius apice longius acuminata, ± 0.2 m. longa et 50 mm. lata, coriacea, praeter costas utrinque minute lineatimque prominulas laevia, punctulis prominulis crebris aequaliter consita. Inflorescentiae suberecto-erectae, submultiflorae, laxiusculae, rotundatae, glaberrimae; axibus subangulatis; bracteis deciduis; ramulis suberectis flores inferiores racemosos superiores plurimos bene umbellatos gerentibus. Flores pedicellis longissimis (usque ad 40 mm.) magnitudineque (ante anthesin 9 mm.) quam maxime insignes, glaberrimi; sepalis fere ad $\frac{1}{3}$ connatis, lobis e late triangulari apice rotundatis; petalis crassis cereis, basi brevissime connatis, apice longe obliqueque acuminatis, punctis multis ad lineam mediam paullo elongatis, crassis pictis; antheris quam petala paullo brevioribus, percrassis, apice fere caudatim acutissimis; ovario glaberrimo, ovoideo, sensim in stylum apicem usque attenuatum, ut videtur constantur quam petala paullo breviorem transeunte; placenta multiovulata.

MINDANAO, in districtu Davao prope Todaya, alt. 1,200 m., mense Aprili florens (1242 *Copeland*).

Obs. Reliquis *Ardisiis* philippinensibus ex *Akosmos* subgenere sat dissimilis, *A. tenerae* Mez e China meridionale proxima.

Ardisia racemoso-panniculata Mez sp. nov.

Frutex ramulis novellis minute lepidotulis; foliis glabris, integerrimis, glandulis marginalibus destitutis, apice eleganter angusteque acuminatis; inflorescentiis e foliorum normalium axillis provenientibus, 2-pinnatim ample panniculatis e ramulis insigniter racemose florigeris compositis, quam folia haud multo brevioribus; pedicellis ± 5 mm. longis; sepalis per anthesin infima basi tantum minuteque tegentibus fere apertis, subtriangularibus, margine glanduloso-ciliatis, perpauce punctatis; petalis valde tegentibus, vix punctatis, apice valde asymmetrice anguste rotundatis; filamentis brevissimis; antheris triangularibus, dorso obscure punctatis; placenta multiovulata.

Frutex squarrosus, 4-metralis (ex cl. *Copeland*!) ramulis gracilibus, teretibus, alutaceis. Folia petiolis gracilibus ± 15 mm. longis, apice in laminas persensim transeuntibus, supra fere planis stipitata, anguste elliptica, utrinque subaequaliter acuminata, ± 0.15 m. longa et 45 mm. lata, chartacea, utrinque laxe prominulo-reticulata et nervis utrinque binis marginalibus e basí ascendentibus maxime insignia, punctis maculisve manifestioribus destituta. Inflorescentiae submultiflorae, suberectae, ± 0.1 m. longae, glabrae; ramulis patentibus vel refractis usque ad 40 mm. longis mihi visis, flores densiuscule sed optime racemosos gerentibus; axibus subangulatis; bracteis deciduis. Flores fragrantes (ex cl. collectore!) ad 7 mm. diam. metientes; sepalis ad ½ connatis ex ovato acutis; petalis basi breviter coalitis, lobis ovato-ellipticis; antheris quam petala bene brevioribus magnis crassisque; filamentis 5-plo brevioribus sed manifestis, glaberrimis stipitatis; ovario glaberrimo, subgloboso stylo sensim apicem usque attenuato, quam petala constanter breviore; stigmate punctiformi.

MINDANAO, in districtu Davao ad montem Apo, alt. 1,700 m., mense Aprili florifera (1187 *Copeland*).

Obs. Species singularis, vix non *Ardisiae laevigatae* Bl. accedit.

Ardisia Elmeri Mez sp. nov.

Frutex ramulis glaberrimis; foliis glabris, integerrimis, glandulis marginalibus majoribus destitutis, apice brevissime lateque acuminatis vel rotundatis; inflorescentiis e foliorum reductorum deciduorumque axillis provenientibus, ample 2-pinnatim panniculatis, e ramulis insigniter racemose florigeris compositis, folia normalia subaequantibus; pedicellis usque ad 3 mm. longis; sepalis fere liberis, per anthesin subapertis, subtriangularibus, margine glanduloso-ciliatis, perpauce punctulatis; petalis valde tegentibus, vix punctatis, apice asymmetrice latiuscule rotundatis; filamentis brevibus; antheris ovato-triangularibus, dorso obscure punctatis; placenta multiovulata.

Frutex fere 3-metralis (ex cl. *Elmer*!) ramulis validiusculis, teretibus, alutaceis. Folia petiolis usque ad 10 mm. longis mihi visis, crassiusculis, supra manifeste caniculatis stipitata, oblonga, basin versus sensim sub-cuneatimque angustata, ± 0.15 m. longa et 45 mm. lata, subcoriacea, utrinque laxe prominulo-reticulata, secus marginem punctis prominulis nonnullis parvis aucta. Inflorescentiae submultiflorae, suberectae, usque ad 0.14 m. longae mihi visae, glabrae; ramulis suberecto-patentibus, usque ad 50 mm. longis, flores multos densiuscule optimeque racemosos, nutantes gerentibus; axibus compressiusculis; bracteis deciduis. Flores decidui, albique (ex cl. collectore!) ante anthesin 3.5 mm. longi; petalis basi breviter coalitis, lobis ellipticis; filamentis quam antherae sub 4-plo brevioribus, glabris; antheris apice breviter acutis; ovario glabro, subgloboso, stylo crassiusculo apicem versus sensim attenuato, stigmate obtuso.

LUZON, prov. Benguet ad rivulos pinetorum, Junio florifera (6493 *Elmer*).

Obs. Et praecedenti satis affinis et nonnullis momentis *Ardisiam sumatranam* Miq. animo revocat.

AMBLYANTHOPSIS Mez.

Amblyanthopsis philippinensis Mez sp. nov.

Foliis toto margine crenatis, late ellipticis; inflorescentiis tenerrimis, fragillimisque, panniculatis; sepalis hyalinis, ad $\frac{1}{3}$ connatis, lobis ex ovato acutis, glabris, petalis fere medium usque coalitis; filamentis antherarum longitudine.

Frutex 2-metralis (ex cl. *Merrill*!) ramulis percrassis squarrosisque, glaberrimis. Folia (forma illa *Ardisiae serratae* Pers. animo revocantia) petiolis usque ad 35 mm. longis, basin versus subclavatim incrassatis, supra inciso-canaliculatis stipitata, utrinque acuminata, usque ad 0.22 m. longa et 85 mm. lata mihi visa, subcoriacea, glaberrima, utrinque dense prominenti-reticulata, punctis magnis multisque atris insignia. Inflorescentiae confractae tantum valdeque mancae mihi ante oculos albae, 0.1–0.15 m. longae (ex cl. *Merrill*!) glaberrimae; pedicellis ± 5 mm. longis. Flores rubri (ex cl. collectore!) minuti vix ultra 3.5 mm. diam. metientes; sepalis teneris, glaberrimis, punctis multis magnisque pallidis, prominentibus conspersis; petalorum lobis per anthesin optime patentibus, ex elliptico apice paullo asymmetrice rotundatis, aeque ad sepala dense punctatis, tenerrimis; filamentis crassis, stipitiformibus; antheris pallidis, capituliformibus, apice rotundatis, dorso bene punctatis; ovario in stirpe nostra stipitiformi (an sterili?) glabro; stigmate discoideo.

LUZON, prov. Bataan ad monte Mariveles, mense Augusto florifera (3881 *Merrill*).

Obs. Species quam maxime notabilis, generis adhuc ex India, Malaya tantum cogniti unica philippinensis, habitu valde peculiari.

DISCOCALYX Mez.

Discocalyx Merrillii Mez sp. nov.

Foliis anguste obovatis, integerrimis; inflorescentiis e ramulis specialibus, basi longe sterilibus apice fertilibus et hic inflorescentias paucifloras simplices racemosas vel pauperrime 2-pinnatim compositas proferentibus nec non inflorescentiarum decisarum cicatricibus tessellatis prodeuntibus; floribus dioicis, regula 5-meris; sepalis alte connatis, margine nudis.

Frutex (ex cll. *Barnes*! et *Whitford*!) ramulis crassis, apicem usque glaberrimis, alutaceis. Folia petiolis brevibus crassisque vix ultra 10 mm. longis, supra canaliculatis, mox corticoso-rugosis stipitata, ± 0.18 m. longa et 53 mm. lata, basi persensim cuneatimque acuta, apice breviter lateque acuminata vel rarius late acuta, coriacea, glaberrima, utrinque costulata et laxe saepiusque obscure prominulo-reticulata, sicca glauco-viridia, opaca. Inflorescentiae pedunculis specialibus compressis, usque ad 80 mm. longis mihi visis sæpius brevioribus, apice gemmis terminatis stipitatae ipsae vix ultra 35 mm. longae, glaberrimae; bracteis deciduis minutis; pedicellis gracilibus, usque ad 4 mm. longis. Flores rubri (ex cl. *Merrill*!) 3 mm. diam. metientes, ♂ tantum mihi cogniti; sepalis medium usque vel paullo ultra connatis, pallido-punctatis, lobis triangularibus, integerrimis vel paucicrenatis; petalis ad ⅓ longit. connatis, lobis patentibus, ellipticis, rotundatis, pauce pallido-punctatis, haud papillosis; antheris dorso dense magnipunctatis, apice rotundatis emarginellisque; ovario glaberrimo, in floribus ♂ stipitiformi; stigmate discoideo.

LUZON, monte Mariveles ad flumen Lamao, Januario-Martio florifera (139 *Barnes*); (213 *Whitford*); (1348 *Borden*); (3745 *Merrill*).

Obs. Discocalyci cybianthoidi Mez affinis species.

RAPANEA Aubl.

Rapanea avenis (Bl.) Mez in Engl. Pflanzenreich **9** (1902) 357.

LUZON, prov. Benguet ad monte Santo Tomas (5811, 6539 *Elmer*).

Java, Celebes.

A LIST OF KNOWN PHILIPPINE FUNGI.

By P. L. Ricker.
(U. S. Department of Agriculture, Washington, D. C., U. S. A.)

In 1904 the author commenced the study of a small collection of Philippine fungi made by Elmer D. Merrill, mostly during the preceding year, consisting of about 60 numbers, of which nearly two-thirds belonged to the *Polyporales*. As a preliminary to the identification of anything more than the best known species, a card catalogue of the species already described from or credited to the Philippines, and a bibliography of the mycological literature of the Islands was made. Thus far fourteen articles have been found dealing wholly or in part with Philippine fungi, and from these articles there has been compiled a list of about 150 species described or reported from the Philippines. The citations for the original publications of all binomials have been carefully verified and corrected, as many of the references in Saccardo's Sylloge, Strenz' Nomenclator, and in most of the papers included in the appended bibliography can not be depended upon and they are especially unreliable in the citations for combinations.

This list should not be regarded as a critical revision of the species already known from the Philippines, but only as an attempt to bring together all references to species credited to the Archipelago by various authors, as a basis for further critical studies.[1] I am indebted to Dr. W. A. Murrill, of the New York Botanical Garden, for assistance in the identification of some of the more difficult species of the *Polyporales*.

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[1] One paper on Philippine fungi, overlooked by Mr. Ricker, was discovered just as the present article was going to press: Berkeley, Contributions to the Botany of H. M. S. *Challenger*, XXXVIII, Enumeration of the Fungi collected during the Expedition of H. M. S. *Challenger*, 1874–75, *Journ. Linn. Soc. Bot.* **16** (1878), 38–54. On pages 45 to 48 thirty-five species and varieties of fungi are enumerated under the heading "Camiguin, Malanipa, and Malamon (Philippines)." Two of these, *Lenzites applanata* Fr., and *Hirneola rufa* Berk., are from Little Ké Island according to the list, and should have been enumerated on page 45 under Little Ké, this island not being one of the Philippine group. A list of the Philippine species enumerated by Berkeley is appended to the present paper and the title has been inserted in the bibliography.—E. D. M.

Many of the species originally described from the Philippines by Berkeley and Montagne are at present imperfectly known, and an examination of the material in several European herbaria will be necessary before all the specimens still on hand can be satisfactorily identified. It is also probable that some of the species previously reported from the Philippines and enumerated here as reported will be found to have been erroneously identified.

The types of all the species here described have been deposited in the United States National Herbarium. Duplicates are in the herbarium of the author and in the herbarium of the Bureau of Science.

ASCOMYCETÆ.

PEZIZALES.

PEZIZA Dill.

Peziza sp. P. Henn. Hedw. **32** (1893) 226, with description.
MINDANAO, near Davao (*Warburg*) fide Henn. l. c.

PILOCRATERA P. Henn.

Pilocratera hindsii (Berk.) P. Henn. Hedw. **32** (1893) 225. *Peziza hindsii* Berk. Lond. Journ. Bot. **1** (1842) 456. *pl. 15.*
MINDANAO, near Davao (*Warburg*) fide Henn. l. c.

Pilocratera tricholoma (Mont.) P. Henn. Engl. Bot. Jahrb. **17** (1893) 9. *Peziza tricholoma* Mont. Ann. Sci. Nat. II. **2** (1834) 77. *pl. 4. fig. 2.*
MINDANAO, near Davao (*Warburg*) fide P. Henn. Hedw. **32:** 226.

ASPERGILLALES.

ASPERGILLUS Micheli.

Aspergillus delacroixii Sacc. & Syd. Syll. Fung. **14** (1899) 1044. *A. olivaceus* Delacr. Bull. Soc. Myc. Fr. **13** (1897) 118, non Preuss. 1852.
LUZON, Province of Batangas, Lipa (3616 *Merrill*) August, 1902. On fruit of *Theobroma cacao* L.

PERISPORIALES.

PARODIELLA Speg.

Parodiella perisporioides (B. & C.) Speg. Anal. Soc. Cient. Arg. **9** (1880) 178. *Dothidea perisporioides* B. & C. Grevillea **4** (1876) 103.
LUZON, Province of Bataan, Lamao (3553 *Merrill*) October, 1903. On leaves of *Desmodium triflorum.*

HYPOCREALES.

EPICHLOË Fries.

Epichloë warburgiana Magn. Atti Congr. Bot. Internat. **1892** (1893) 157. *pl. 8.*
LUZON, near Cabongenam (*Warburg*) fide Henn. Hedw. **32:** 223.

HYPOCREA Fries.

Hypocrea peltata (Jungh.) Sacc. Syll. Fung. **2** (1883) 536. *Sphaeria peltata* Jungh. Ann. Sci. Nat. II. **16** (1841) 310.

PHILIPPINES (2028 *Cuming*) 1836–40, fide Berk. Lond. Journ. Bot. **1** (1842) 155. *pl. 7. f. 7.*

NECTRIA Fries.

Nectria manilensis P. Henn. in Warb. Mons. **1** (1900) 25. *pl. 1. f. 14.*

LUZON, Manila (*Wichara*) May 20, 1861, fide Henn. l. c. On dead bark.

USTILAGINOIDEA Bref.

Ustilaginoidea (?) **ochracea** P. Henn. in Warb. Mons. **1** (1900) 26. *pl. 1. fig. 16.*

MINDANAO (*Warburg*) fide Henn. l. c. On *Eriochloa.*

Ustilaginoidea virens (Cke.) Tak. Bot. Mag. Tokyo **10** (1896) 19. *pl. 2. f. 1–8.* *Ustilago virens* Cke. Grev. **7** (1878) 15. *Tilletia oryzae* Pat. Bull. Soc. Myc. Fr. **13** (1897) 124. *pl. 10. f. 2.* *Ustilaginoidea oryzae* Bref. Untersuch. **12** (1895) 194. *pl. 11. f. 22–29.*

LUZON, Manila (*Loher*). In ovaries of *Oryza sativa,* fide Mass. Kew Bull. (1899) 176.

DITHIDEALES.

AUERSWALDIA Sacc.

Auerswaldia examinans (Berk.) Sacc. Syll. Fung. **2** (1883) 626. *Sphaeria examinans* Berk. Lond. Journ. Bot. **1** (1842) 156.

PHILIPPINES (2163 *Cuming*) fide Berk. l. c.

EUTYPA Tul.

Eutypa bambusina Penz. & Sacc. Malpighia **11** (1897) 501; Ic. Fung. Jav. *pl. 23. f. 1.* *E. barbosae* v. Hohnel in Rehm. Ascom. No. 1376.

CULION (3606 *Merrill*) December, 1902. On dead bamboo.

HYPOPTERIS Berk.

Hypopteris apiospora (Dur. & Mont.) Berk. in Hook. Journ. Bot. & Kew Miscel. **6** (1854) 227. *Sphaeria apiospora* Dur. & Mont. Fl. Alg. **1** (1849) 482. *pl. 25. f. 1.* *Apiospora montagnei* Sacc. Atti Soc. Venet.-Trent. Padova, **4** (1875) 9. *Detonina apiospora* Kuntze Rev. Gen. Pl. **2** (1891) 851.

LUZON, Province of Bataan, Lamao (3533 *Merrill*) October, 1903. On dead bamboo.

The sporidia in *Merrill's* specimen measure 8.5–12 by 22–26 μ and the asci 19–23 by 98–123 μ, differing but slightly from the measurements given in Sacc. Syll., and approaching the specimens mentioned in Ellis, N. A. Pyr. 311, from Louisiana.

The generic name used by most authors for this and related species is *Apiospora* Sacc. Soc. Veneto-Trent. Padova. **4** (1875) 9, which is untenable on account of *Apiosporium* Kunze, 1817. Saccardo uses the name *Apiospora montagnei,* and the original publication would indicate that it is a nom. nov. for *Sphaeria apiospora* D. & M. There is a *Sphaeria montagnei* Fr. Ann. Sci. Nat. **1** (1834) 337. *pl. 11. f. 3,* and I have a suspicion that the names have been confused. Judging from the descriptions and plates accompanying both original descriptions, and in Dur. & Mont. Fl. Alg., the two species are not congeneric.

PHYLLACHORA Nitschke.

Phyllachora merrilli Ricker sp. nov.

Stromata gregarious, confluent, epiphyllous, convex, black and shining, up to 6 mm. in diameter, seated on yellowish spots; asci cylindrical-clavate, 14–20 by 56–65 μ, short stipitate, 8-spored; sporidia obliquely uniseriate, or usually partially biseriate or overlapping, elliptical, uniseptate, at first hyaline, becoming brownish, 4–6 by 8–12 μ; paraphyses few, filiform.

MINDORO, Bulalacao (3579 *Merrill*) April, 1903. (Type.) On leaves of *Ficus* sp. Although there are a large number of *Phyllachoras* described on *Ficus*, this species seems to differ from all of them. In asci and spore measurements it approaches closely *P. infectoria* Cke., and *P. karnbachii* P. Henn. The latter species has asci 10–15 by 50 by 62 μ and sporidia 7–8 by 9–12 μ, which are lighter colored when mature, and although seemingly different from the former the description is too incomplete to say positively whether they are the same or not, but it is improbable.

SPHAERIALES.

DALDINIA de Not.

Daldinia concentrica (Bolt.) Ces. & de Not. Comm. Critt. Ital. **1** (1863) 198. *Sphaeria concentrica* Bolt. Hist. Fung. Halifax **3** (1791) 180. *pl. 180.*

LUZON, Province of Tarlac (3595 *Merrill*) November, 1903. On charcoal of recent fire.

Daldinia vernicosa (Schw.) Ces. & de Not. l. c. 198. *Sphaeria vernicosa* Schw. Journ. Acad. Sci. Philadel. **5** (1825) 341.

LUZON, Manila fide Klotz. in Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1**: 241. *Hemisphaeria concentrica obovata substipitata* Nees.

HYPOXYLON Bulliard.

Hypoxylon annulatum depressum Welw. & Cur. Trans. Linn. Soc. Bot. **26** (1868) 283.

CULION (3604 *Merrill*) December, 1902. On dead branches.

Hypoxylon rubiginosum (Pers.) Fr. Summ. Veg. Scand. (1846) 384. *Sphaeria rubiginosa* Pers. Syn. (1801) 11.

LUZON, Province of Tarlac (3596 *Merrill*) November, 1903.

KRETSCHMERIA Fries.

Kretschmeria coenopus (Fr.) Sacc. Syll. Fung. **2** (1883) XXIX. *Sphaeria coenopus* Fr. Linnaea **5** (1830) 542. *Hypoxylon coenopus* Mont. Ann. Sci. Nat. **13** (1840) 356.

PHILIPPINES (2163 *Cuming*) fide Berk. Lond. Journ. Bot. **3**: 194.

NUMMULARIA Tul.

Nummularia philippinensis Ricker sp. nov.

Stroma at first covered by the epidermis, but soon erumpent and free, convex, oblong-ovate, black, 1.5–2.5 by 4–6 cm.; perithecia cylindrical, black, closely packed, about 1.5 mm. high; asci cylindrical, 12–15 by 170–185 μ; sporidia uniseriate, elliptical-oblong, nearly hyaline at first, soon opaque, 11–14 by 25–28 μ.

LUZON, Province of Bataan, Lamao (3537 *Merrill*) October, 1903 (Type). On prostrate log.

This species externally resembles *Nummularia bulliardi* Tul., which however has asci 10 by 100–120 μ and sporidia 9–10 by 11–14 μ.

PORONIA Willd.

Poronia pileiformis (Berk.) Fr. Nov. Act. Reg. Soc. Sci. Ups. **1** (1855) 129.
Sphaeria pileiformis Berk. Lond. Journ. Bot. **1** (1842) 155. *pl. 7. f. 6.*

PHILIPPINES (1980 *Cuming*) fide Berk. l. c.

SPHAERIA Auct.

Sphaeria micraspis Berk. Lond. Journ. Bot. **1** (1842) 156. *pl. 7. f. 9.*

PHILIPPINES (2164 *Cuming*) fide Berk. l. c.

This is probably not a fungus but a lichen. Berkeley opp. cit. 457 refers it to *Verrucaria nitens* Fée.

TREMATOSPHAERIA Fuck.

Trematosphaeria palaquii Ricker sp. nov.

Perithecia gregarious or scattered, slightly immersed, subcarbonaceous, black, ovate-globose, 1–2 mm. diam.; ostiolum usually obtusely conical, soon deciduous, paraphyses filiform, numerous, larger than the asci; asci clavate or cylindrical, 14–15 by 132–141 μ; sporidia uniseriate, ovate-oblong, 5-spored, at first hyaline then becoming brown, 3-septate, not constricted at septum, 8–12 by 17–20 μ.

LUZON, Province of Tarlac (3597 *Merrill*) November, 1903. (Type.) On bark of *Palaquium latifolium*.

XYLARIA Hill.

Xylara fulvo-lanata (Berk.) Sacc. Syll. Fung. **1** (1882) 346. *Sphaeria fulvo-lanata* Berk. Lond. Journ. Bot. **1** (1842) 154.

PHILIPPINES (2218 *Cuming*) fide Berk. l. c.

Xylaria hypoxylon (Linn.) Grev. Fl. Edin. (1824) 355. *Clavaria hypoxylon* Linn. Sp. Pl. ed. 1, **2** (1753) 1182.

LUZON, Province of Bataan, Lamao (3530 *Merrill*) October, 1903. On prostrate logs.

Xylaria luzonensis P. Henn. Hedw. **32** (1893) 225. *pl. 8. f. 3.*

LUZON (*Warburg*). On *Afzelia bijuga* A. Gray, fide Henn. l. c.

Xylaria polymorpha (Pers.) Grev. Fl. Edin. (1824) 355. *Sphaeria polymorpha* Pers. Comm. Fung. Clav. (1787) 17.

LUZON, Province of Bataan, Lamao (3534 *Merrill*) October, 1903. On dead trees. MINDANAO, near Davao (*Warburg*) fide Henn. Hedw. **32**: 224.

BASIDIOMYCETÆ.

USTALIGINALES.

CINTRACTIA Cornu.

Cintractia axicola (Berk.) Cornu. Ann. Sci. Nat. VI. **15** (1883) 279. *Ustilago axicola* Berk. Ann. Nat. Hist. II. **9** (1852) 200.

MINDANAO, Davao (*Warburg*) fide Henn. in Warburg, Mons. **1**: 2. LUZON, Manila (*Warburg*) Henn. l. c.

UREDINALES.

AECIDIUM Pers.

Aecidium luzoniense P. Henn. in Warb. Mons. **1** (1900) 2.
LUZON, Province of Rizal, Montalban (*Warburg*). On *Phyllanthus*.

HEMILEIA Berk. & Broome.

Hemileia vastatrix Berk. & Broome Gard. Chron. (1869) 1157; De Bérard Rapport sur un maladie des Caféiers aux îles Philippines, Bull. Minist. Agr. (Paris) **8** (1893) 1008–1024; Delacroix Les maladies et les ennemis des Caféiers (1900) 42; Massee, Kew. Bull. (1906) 38.
PHILIPPINES, fide De Bérard, Delacroix and Massee ll. cc. On *Coffea arabica* and *C. liberica*. For bibliography see Delacroix l. c. 14.

PUCCINIA Pers.

Puccinia thwaitesii Berk. Journ. Linn. Soc. Bot. **14** (1873) 19.
LUZON, Province of Bataan, Lamao (3552 *Merrill*) October, 1903. On *Justicia gendarussa*.

UREDO Pers.

Uredo davaoensis Syd. Ann. Myc. **4** (1906) 30.
MINDANAO, Davao, (600 *Copeland*) March 21, 1904. On leaves of *Cyanotis*.

Uredo hygrophilae Syd. l. c. 31.
MINDANAO, Davao (357 *Copeland*) March 7, 1904. On leaves of *Hygrophila salicifolia*.

Uredo philippinensis Syd. l. c. 32.
MINDANAO, Davao (570 *Copeland*) March 19, 1904. On *Cyperus polystachyus*.

Uredo wedeliae-biflorae Syd. l. c. 32.
MINDANAO, District of Zamboanga, San Ramon (759 *Copeland*) May 17, 1904. On *Wedelia biflora*.

UROMYCES Link.

Uromyces hewittiae Syd. Ann. Myc. **4** (1906) 30.
MINDANAO, District of Cotabato (1343, 1344 *Copeland*) May 8, 1904. On leaves of *Hewittia bicolor*.

Uromyces deeringiae Syd. Ann. Myc. **1** (1903) 324.
LUZON, fide Sydow, l. c., on *Deeringia*.

AURICULARIALES.

AURICULA.

Auricula auricula (Linn.) Underw. Mem. Torr. Bot. Club. **12** (1902) 15. *Tremella auricula* Linn. Sp. Pl. **2** (1753) 1157.
LUZON, Province of Bataan, Lamao (3509 *Merrill*) October, 1903.

THELEPHORALES.

CLADODERRIS Pers.

Cladoderris blumei Lev. Ann. Sci. Nat. III. **2** (1844) 213.
PHILIPPINES, on trunks (Herb. Delessert) fide Lev. l. c.

Cladoderris crassa (Klotz.) Fr. Kongl. Vet.-Akad. Handl. Stock. **1848**^{i} (1849) 142. *Actinostroma crassum* Klotz. Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. 237.
LUZON, Manila, on old trunks, fide Klotz. l. c.

Cladoderris dendritica (Pers.) Berk. Lond. Journ. Bot. **1** (1842) 152. *Thelephora dendritica* Pers. Freyc. Voy. (1827) 176. *pl. 1. f. 4.*

PHILIPPINES, fide Berk. l. c. Three forms are recognized; f. *junior* (1988 *Cuming*); f. *adulta* (1990 *Cuming*); f. *hymenio scabro* (2036 *Cuming*).

Cladoderris infundibuliformis (Klotz.) Fr. Kongl. Vet.-Akad. Handl. Stock. **1848**[1] (1849) 141. *Actinostroma infundibuliforme* Klotz. Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1**: 237.

LUZON, Manila, on old trunks, fide Klotz. l. c.

CORTICIUM Pers.

Corticium hydnatium Berk. in Lond. Journ. Bot. **1** (1842) 153.

PHILIPPINES (2187 *Cuming*) fide Berk. l. c.

RHIPIDONEMA Matt.

Rhipidonema erectum (Berk.) Sacc. Syll. Fung. **6** (1888) 689. *Dichonema erectum* Berk. Lond. Journ. Bot. **1** (1842) 157. *pl. 7 f. 11.*

PHILIPPINES (2234 *Cuming*) fide Berk. l. c.

STEREUM Pers.

Stereum adustum Lév. Ann. Sci. Nat. IV. **2** (1844) 213. *Thelephora adusta* Lév. Gaud-Beaupr. Voy. Bonite **1** (1846) 192. *pl. 139. f. 1.*

LUZON, Manila, on fallen branches (*Gaudichaud*), Herb. Mus. Paris fide Lév. l. c.

Stereum cinereo-badium Fr. Epicr. **1** (1838) 547; Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1**: 238. *pl. 5. f. 3.* *Thelephora badia* Hook; Kth. Syn. Pl. Aeq. **1** (1822) 12. *T. moluccana* Pers.; Freyc. Voy. (1827) 175.

LUZON, Manila, on trunks of trees, fide Klotz. l. c.

The above synonomy is given by Fries, but it can not be vouched for.

Stereum illudens Berk. Lond. Journ. Bot. **4** (1845) 59.

CULION, on fallen logs (3603 *Merrill*) December, 1902.

Stereum lobatum (Kze.) Fr. Epicr. **1** (1838) 547. *Thelephora lobata* Kze. Linnaea **5** (1830) 527.

MINDORO, Baco River (3580 *Merrill*) April, 1903. MINDANAO, fide Henn. in Warb. Mons. **1**: 6. LUZON, Province of Pampanga, Mount Arayat, fide Henn. l. c.

Stereum luzoniense Ricker sp. nov.

Subresupinate, effuse or elongated and confluent; pileus suborbicular, membranaceous-coriaceous, strigose-hirsute, fuscous, somewhat zonate, 0.5 to 1 cm. broad; hymenium glabrous, smooth, cinereous; spores globose, hyaline, 2.8 to 3.5 μ in diameter.

LUZON, Province of Bataan, Mount Mariveles (3531 *Merrill*) October, 1903. On prostrate logs at the summit of the mountain at about 1,400 m.

Resembles *Stereum complicatum* Fr., but differs in color of pileus and hymemium, which is lighter and seldom more than softly pubescent.

Stereum nitidulum Berk. Lond. Journ. Bot. **2** (1843) 638.

NEGROS (*Usteri*) fide Henn. in Usteri Beitr. (1905) 136.

Stereum perlatum Berk. Lond. Journ. Bot. **1** (1842) 153.

PHILIPPINES (2034 *Cuming*) fide Berk. l. c.

Massee in his monograph considers this a synonym of *Stereum lobatum* (Kze.) Fr.

Stereum spectabile Klotz. Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. **1:** 238. *pl. 5. f. 2.*

LUZON, Manila, on tree trunks, fide Klotz. l. c.

THELEPHORA Ehrh.

Thelephora diamesa Ricker sp. nov.

Pileus infundibuliform, glabrous, coriaceous, margin lobed, 2 to 4 cm. broad, tapering rather abruptly to one-third or one-half its length, forming a hollow stipe 2.5 cm. long (whole plant 4 to 7 cm. high), lemon yellow when fresh, cream-colored when dry; hymenium glabrous smooth, orange yellow when fresh, tawny yellow when dry; spores globose, hyaline, 2.5 to 3 μ in diameter.

LUZON, Province of Bataan, Lamao (3510 *Merrill*) October, 1903. Damp soil in forests (rainy season).

The note with the specimens says "lemon to orange yellow." It may be so throughout, but as when dry the hymenium is darker than the pileus I have placed the colors as above and await further collections or notes to verify or correct the color.

Apparently related to *Thelephora lamellata* B. & C., and *T. caperata* Berk. & Mont., but is distinguished from both by its glabrous pileus.

Thelephora paradoxa Lév. Ann. Sci. Nat. IV. **2** (1844) 206; Gaud.-Beaupre Voy. Bonite, **1** (1846) 190. *pl. 139. f. 4.*

LUZON, Manila, on trunks of trees (Herb. Mus. Paris) fide Lév. l. c.

CLAVARIALES.

CLAVARIA Vaill.

Clavaria surculus Berk. Lond. Journ. Bot. **1** (1842) 154. *pl. 6. f. 5.*

PHILIPPINES (2042 *Cuming*) fide Berk. l. c.

LACHNOCLADIUM Lév.

Lachnocladium sp.

MINDANAO, Davao, Mount Dagatpan (*Warburg*) fide Henn. Hedw. **32** (1893) 218, with description.

HYDNALES.

HYDNUM Linn.

Hydnum webii Berk. Lond. Journ. Bot. **3** (1844) 190.

PHILIPPINES (2172 *Cuming*) fide Berk. l. c.

IRPEX Fries.

Irpex flavus Klotz. Linnaea **8** (1833) 488.

LUZON, Province of Isabela (*Warburg*) fide Henn. Hedw. **32:** 218.

POLYPORALES.

CORIOLUS Quél.

Coriolus versicolor (L.) Murr. *Boletus versicolor* L. Sp. Pl. (1753) 1176. *Polystictus versicolor* Fr. Nov. Act. Reg. Soc. Sci. Ups. IV. **1** (1855) 86.

LUZON (*Warburg*) fide Henn. Hedw. **32:** 220 and in Warb. Mons. **1:** 11. NEGROS (*Usteri*) fide Henn. in Usteri Beitr. (1905) 136.

DEADALIA Pers.[2]

Daedalia elegans Spreng. Vet. Akad. Handl. (1820) 51. *Daedalia deplanata* Fr. Linnaea **5** (1830) 513. *Lenzites applanata* Fr. Epicr. (1838) 404.

Luzon, Manila (*Loher*) fide Massee in Kew Bull. (1899) 176. Negros (*Usteri*) fide Henn. in Usteri Beitr. (1905) 136.

Daedalea inconcinna Berk. Lond. Journ. Bot. **1** (1847) 151.

Philippines (2021 *Cuming*) fide Berk. l. c.

Daedalia repanda (Fr.) Pers.; Sagra Hist. Pol. Nat. Cuba **9** (1845) 232; Pers. opp. cit. **12** (1855) *pl. 14. f. 5. Lenzites repanda* Fr. Epicr. (1838) 404.

Culion (3574 *Merrill*) December, 1902, on fallen logs. Negros (*Usteri*) fide Henn. in Usteri Beitr. (1905) 136. Luzon, Province of Tayabas (*Warburg*) fide Henn. Hedw. **32:** 221.

This species is closely related to *Daedalia elegans* Spreng., and may be the same. Specimens from tropical and subtropical regions of both hemispheres indicate that both are extremely variable and with many intergrading forms.

Daedalea tenuis Berk. Lond. Journ. Bot. **1** (1842) 151.

Philippines (2137 *Cuming*) fide Berk. l. c.

ELFVINGIA Karst.

Elfvingia tornata (Pers.) Murr. Bull. Torr. Bot. Club. **30** (1903) 301. *Polyporus tornatus* Pers.; Gaud.-Beaupr. Voy. Freyc. (1827) 173. *Polyporus australis* Fr. Elench. **1** (1828) 108.

Culion (3572 *Merrill*) December 1902, on fallen logs. Philippines (2041 *Cuming*) fide Berk. Lond. Journ. Bot. **3:** 188. Negros (*Usteri*) fide Henn. in Usteri Beitr. (1905) 136.

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[2] The replacing of the genus *Deadalia* by *Agaricus* by Dr. W. A. Murrill in Bull. Torr. Bot. Club. **32** (1905) 83, will hardly meet the approval of many mycologists. Neither is it in accord with the rules promulgated by the Botanical Club of the A. A. A. S., in Bull. Torr. Bot. Club. **31** (1904) 249, 261. Canon 15*c* requires a citation of nonbinomial literature, but there is no such citation in Linn. Gen. Pl. ed. 5 (1754), 492 under *Agaricus* Dill. The crediting of the genus *Agaricus* to Dillenius does not constitute a citation as it is not definite enough. It should refer to some work in particular. Besides this Canon 15*f* provides for the selection of the types of Linnean genera from the most common or officinal or European species as suggested by Linnaeus, Phil. Bot. (1751), 197. There are but few mycologists who will not agree to accept *Agaricus campestris* L., as the type of the genus *Agaricus*.

The next name used for this group of species was, according to Murrill, *Striglia* Adans. Fam. Pl. **2** (1763), 10, based on "Battar. *t. 38*." This consists of *figures A–G and d*. The only one of these figures with its accompanying description that can be connected with a binomial contemporaneous with or earlier than Adanson is *fig. d, Agaricus pectunculi forma elegans* Batt., under which is given as a synonym *Agaricus parvus lamellatus pectunculi forma elegans Raii*. This name is given under *Agarico-fungus lamellis bifidis pulverulentis* Hall. Enum. Helv. **1** (1742) 58, which is in turn cited under *Agaricus alneus* Linn. Sp. Pl. **2** (1753) 1176. Therefore, the name *Striglia* Adans., under the above-cited rules, must replace the generic name *Schizophyllum* Fr., unless there is still an older valid name, in which case it would become a synonym.

Under the same rules *Daedalia quercina* (L.) Pers., would become the type of the genus *Dadalia* Prs. Syn. (1801) 499.

FAVOLUS Fries.[3]

Favolus apiarius (Pers.). *Hexagona apiaria* (Pers.) Fr. Epicr. (1838) 497. *Polyporus apiaria* Pers.; Feryc. Voy. (1827) 160. *pl. 2. f. 5.*

PHILIPPINES (1989 *Cuming*) fide Berk. Lond. Journ. Bot. **1**: 152. LUZON (*Loher*) fide Massee, Kew Bull. (1899) 176.

Favolus ciliatus (Klotz.). *Hexagona ciliata* Klotz. Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. 235. *pl. 5. f. 1.*

LUZON, Manila, on dead branches, fide Klotz. l. c.

Favolus rigidus (Berk.). *Hexagona rigida* Berk. Journ. Linn. Soc. Bot. **16** (1878) 54.

LUZON, Manila (*Loher*) fide Massee, Kew Bull. (1899) 176.

Favolus tenuis (Hook.) Murr. Bull. Torr. Bot. Club. **32** (1905) 100. *Boletus tenuis* Hook. in Kth. Syn. **1** (1822) 10. *Hexagona tenuis* Fr. Epicr. (1838) 498.

PHILIPPINES (1984 *Cuming*) fide Berk. Lond. Journ. Bot. **1**: 152.

Favolus wightii (Klotz.). *Polyporus wightii* Klotz. Linnaea **7** (1832) 200. *pl. 10.* *Hexagona wightii* Fr. Epicr. **1** (1838) 496.

LUZON, Manila, on trunks of trees, fide Lev. in Gaud.-Beaupr. Voy. **1**: 187; Province of Tarlac (3600 *Merrill*) November, 1903.

FOMES Fries.

Fomes amboinensis (Lam.) Cke. Grev. **14** (1885) 118. *Agaricus amboinensis* Lam. Encycl. **1** (1783) 51. *Polyporus amboinensis* Fr. Syst. Myc. **1** (1821) 354. (Icones: Rump. Herb. Amb. 11 *pl. 57. f. 1; Bisch. Handl. f. 3312.*)

PHILIPPINES (1985 *Cuming*) fide Berk. Lond. Journ. Bot. **1**: 147. MINDANAO (*Warburg*) fide Henn. Hedw. **32**: 219. LUZON, Province of Isabela (*Warburg*) fide Henn. l. c. NEGROS (*Usteri*) fide Henn. in Usteri Beitr. (1905) 136.

Fomes ochreo-laccatus (Mont.) Cke. Grev. **14** (1885) 18. *Polyporus ochreolaccatus* Mont. Ann. Sci. Nat. II. **18** (1842) 241.

PHILIPPINES (1989 *Cuming*) in Herb. Delessert fide Mont. l. c.; (1979 *Cuming*) fide Berk. Lond. Journ. Bot. **3**: 188.

Fomes rimosus (Berk.) Cke. Grev. **14** (1885) 18. *Polyporus rimosus* Berk. Lond. Journ. Bot. **4** (1845) 54.

NEGROS (*Usteri*) fide Henn. in Usteri Beitr. (1905) 136.

Fomes senex (Nees & Mey.) Cke. Grev. **13** (1885) 118. *Polyporus senex* Nees & Mey. Ann. Sci. Nat. II **5** (1836) 70.

LUZON (*Loher*) fide Massee in Kew Bull. (1899) 176; Province of Isabela (*Warburg*) fide Henn. Hedw. **32**: 219.

Fomes tostus (Berk.) Cke. Grev. **14** (1885) 21. *Polyporus tostus* Berk. Lond. Journ. Bot. **3** (1844) 189.

PHILIPPINES (2031 *Cuming*) fide Berk. l. c.

GANODERMA Karst.

Ganoderma praetervisus Pat. Bull. Soc. Myc. Fr. **5** (1889) 78. *Polyporus auriscalpium* Mont. Ann. Sci. Nat. **1** (1834) 336. *pl. 5*, non Pers. *Fomes praetervisus* Sacc. Syllog. Fung. **9** (1891) 178.

MINDANAO (*Warburg*) fide Henn. Hedw. **32**: 219.

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[3] *Favolus* and *Hexagona* were interchanged by early authors and the error has persisted in Sacc. Syll. Fung. They are here used in the original sense.

Ganoderma pseudoboletus (Jacq.) Murr. Bull. Torr. Bot. Club **29** (1902) 602. *Agaricus pseudoboletus* Jacq. Fl. Austr. **1** (1773) 26. *pl. 41.* *Boletus lucidus* Leys. Fl. Hal. (1783) 300. *Polyporus lucidus* Fr. Syst. Myc. **1** (1821) 353.

Luzon, Province of Rizal, Montalban (3611 *Merrill*) January, 1903; Province of Isabela (*Warburg*) fide Henn. Hedw. **32**: 219.

HAPLOPILUS Karst.

Haplopilus gilvus (Schw.) Murr. Bull. Torr. Bot. Club. **31** (1904) 418. *Polyporus gilvus* Schw. Syn. Fung. Car. (1818) 70.

Luzon, Province of Bataan, Lamao (3525 *Merrill*) October, 1903, on fallen logs. Negros (*Usteri*) fide Henn. in Usteri Beitr. (1905) 136.

Haplopilus licnoides (Mont.) Murr. Bull. Torr. Bot. Club. **31** (1904) 417. *Polyporus licnoides* Mont. Ann. Sci. Nat. **13** (1840) 204; Sagra Hist. Pol. y Nat. Cuba **12** (1855) *pl. 16. f. 2.*

Culion (3607 *Merrill*) December, 1902. On fallen logs.

HEXAGONA Fries.

Hexagona fibrillosa (Lév.). *Favolus fibrillosus* Lév. Ann. Sci. Nat. III. **2** (1844) 201.

Luzon, Manila, on trunks (Herb. Mus. Paris) fide Lév. l. c.

Hexagona philippinensis (Berk.) *Polyporus philippinensis* Berk. Lond. Journ. Bot. **1** (1872) 148. *Favolus philippinensis* Sacc. Syll. Fung. **6** (1888) 393.

Philippines (2038 *Cuming*) fide Berk. l. c.

Hexagona purpurea (Mass.) *Favolus purpureus* Mass. Kew Bull. (1899) 176.

Luzon (*Loher*) fide Massee l. c.

Hexagona hispidula (B. & C.) Murr. Bull. Torr. Bot. Club. **31** (1904) 329. *Favolus hispidulus* B. & C. Journ. Linn. Soc. Bot. **10** (1868) 32.

Luzon, Province of Bataan, Mount Mariveles (3537 *Merrill*) October, 1903. On dead trees at the summit of the mountain at about 1,400 m.

GLEOPHYLLUM Karst.

Gleophyllum abietinum (Bull.) Karst. Bidr. Finl. Nat. Och. Folk **37** (1882) 80. *Agaricus abietinus* Bull. Herb. France **4** (1789) 442. *pl. 442.* *Lenzites abietina* Fr. Epicr. (1838) 407.

Philippines (2032 *Cuming*) fide Berk. Lond. Journ. Bot. **1**: 147.

LENZITES Fries.

Lenzites acuta Berk. Lond. Journ. Bot. **1** (1842) 146.

Philippines (2028 *Cuming*) fide Berk. l. c.

Lenzites pallida Berk. Lond. Journ. Bot. **1** (1842) 146.

Philippines (2030 *Cuming*) fide Berk. l. c.

Lenzites platypoda Lév. Ann. Sci. Nat. III. **2** (1844) 180.

Luzon, Manila, on trunks (Herb. Mus. Paris) fide Lév. l. c.

MICROPORUS Beauv.

Microporus perula Beauv. Fl. d'Oware et Benin **1** (1804) 14. *pl. 8. f. 2.*

Culion (3605 *Merrill*) December, 1902, on decaying logs. Mindanao, Taraca River (*E. A. Mearns*) April 6, 1904.

POLYPORUS Mich.

Polyporus grammocephalus Berk. Lond. Journ. Bot. **1** (1842) 148.
Philippines (1991 *Cuming*) fide Berk. l. c.

Polyporus vibecinus Fr. Kongl. Vet.-Akad. Handl. Stock. **1848**^{1} (1849) 126.
Luzon, Province of Isabela (*Warburg*) fide Henn. Hedw. **32:** 219.

POLYSTICTUS Fries.

Polystictus affinis (Nees) Fr. Nov. Act. Reg. Soc. Sci. Ups. III. **1** (1855) 75. *Polyporus affinis* Nees. Nov. Act. Acad. Nat. Cur. **13**^{1} (1826) *pl. 4. f. 1.*

Luzon, Province of Isabela (*Warburg*) fide Henn. Hedw. **32:** 220; Province of Bataan, Mount Mariveles (3495 *Merrill*) October, 1903, on dead trees at the summit at about 1,400 m.; Lamao (3535 *Merrill*) October, 1903.

Polystictus badius (Berk.) Cke. Grev. **14** (1886) 86. *Trametes badia* Berk. Lond. Journ. Bot. **1** (1842) 151.

Philippines (1995 *Cuming*) fide Berk. l. c. Culion (3526 *Merrill*) December, 902, on fallen logs.

Polystictus brunneolus (Berk.) Fr. Nov. Act. Reg. Soc. Sci. Ups. III. **1** (1855) 75. *Polyporus brunneolus* Berk. Lond. Journ. Bot. **3** (1844) 187
Philippines (2027 *Cuming*) fide Berk. l. c.

Polystictus caperatus (Berk.) Fr. Nov. Act. Reg. Soc. Sci. Ups. III. **1** (1855) 92. *Polyporus caperatus* Berk. Ann. Nat. Hist. **3** (1839) 391.
Philippines (2024 *Cuming*) fide Berk. Lond. Journ. Bot. **1:** 149.

Polystictus cichoriaceus Fr. Nov. Act. Reg. Soc. Sci. Ups. III. **1** (1855) 92. *Polyporus intybaceus* Berk. Lond. Journ. Bot. **1** (1842) 149, non Fr.

Philippines (1987 *Cuming*) fide Berk. l. c. Luzon, Province of Bataan, Lamao (3528 *Merrill*) October, 1903.

Polystictus cumingii (Berk.) Cke. Grev. **14** (1886) 77. *Polyporus cumingii* Berk. Lond. Journ. Bot. **1** (1842) 147.
Philippines (1986 *Cuming*) fide Berk. l. c.

Polystictus dermatodes (Lév.) Fr. Nov. Act. Reg. Soc. Sci. Ups. III. **1** (1855) 91. *Trametes dermatodes* Lév. Ann. Sci. Nat. III. **2** (1844) 196. *Polyporus dermatodes* Lév. Gaud.-Beaupr. Voy. Bonite, **1** (1846) 180. *pl. 138. f. 2.*

Luzon, Manila, on trunks (Herb. Mus. Paris) fide Lév. l. c. This species is said to closely resemble in habit *Hexagonia sericea* Fr. Epicr. (1838) 497, and has been reduced by some authors to the latter.

Polystictus elongatus (Berk.) Fr. Nov. Act. Reg. Soc. Sci. Ups. III **1** (1855) 78. *Polyporus elongatus* Berk. Lond. Journ. Bot. **1** (1842) 149.

Philippines (2023 *Cuming*) fide Berk. l. c. Luzon, Province of Isabela (*Warburg*) fide Henn. Hedw. **32:** 220. Berkeley says, op. cit. 457, that this is "probably *Polyporus flabellum* Mont.," but later authors have kept them separate.

Polystictus flabelliformis (Klotz.) Cke. Grev. **14** (1886) 78. *Polyporus flabelliformis* Klotz. Linnaea **8** (1833) 483.
Mindanao (*Warburg*) fide Henn. Hedw. **32:** 220.

Polystictus gallo-pavonis B. & Br. Trans. Linn. Soc. Bot. II. **2** (1883) 59.
Philippines (*Warburg*) fide Henn. in Warb. Mons. **1:** 11.

Polystictus kurzianus Cke. Grev. **15** (1886) 22.
Luzon, Province of Tayabas (*Warburg*) fide Henn. Hedw. **32:** 220.

Polystictus luteus (Nees) Fr. Nov. Act. Reg. Soc. Sci. Ups. III. **1** (1855) 74. *Polyporus luteus* Nees. Nov. Act. Acad. Nat. Cur. **13** (1826) 16. *pl. 4.*

MINDORO, Baco River (3582 *Merrill*) April, 1903. PALAWAN, E-wi-ig River (3585 *Merrill*) February, 1903.

Polystictus meyenii (Klotz.) Cke. Grev. **14** (1886) 83. *Polyporus meyenii* Klotz. Nov. Act. Acad. Nat. Cur. **19** (1843) Suppl. 236.

LUZON, Manila, on trunks, fide Klotz. l. c.

Polystictus microloma (Lév.) Cke. Grev. **14** (1885) 79. *Polyporus microloma* Lév. Ann. Sci. Nat. III **2** (1844) 183.

LUZON, Manila, on trunks (Herb. Mus. Paris) fide Lév. l. c.

Polystictus modestus (Kunze.) Cke. Grev. **14** (1886) 79. *Polyporus modestus* Kze. Linnaea. **5** (1830) 519.

PHILIPPINES (2027 *Cuming*) fide Berk. Lond. Journ. Bot. **1**: 149.

Polystictus obstinatus Cke. Grev. **14** (1886) 83. *Trametes obstinatus* Cke. l. c. **12** (1883) 17.

LUZON, Province of Isabela (*Warburg*) fide Henn. Hedw. **32**: 220.

Polystictus occidentalis (Klotz.) Fr. Nov. Act. Reg. Soc. Sci. Ups. III. **1** (1855) 90. *Polyporus occidentalis* Klotz. Linnaea **8** (1833) 486. *Trametes occidentalis* Fr. Epicr. (1838) 491

CULION (3571 *Merrill*) December, 1902. LUZON, Province of Isabela, (*Warburg*) fide Henn. Hedw. **32**: 219. NEGROS (*Usteri*) fide Henn. in Usteri Beitr. (1905) 136.

Polystictus persoonii Cke. Grev. **14** (1886) 85. *Daedalea sanguinea* Klotz. Linnaea **8** (1833) 481.

NEGROS (*Usteri*) fide Henn. in Usteri Beitr. (1905) 136.

Polystictus velutinus (Fr.) Cke. Grev. **14** (1886) 83. *Boletus velutinus* Pers. Syn. **2** (1801) 539. *Polyporus velutinus* Fr. Syst. Myc. **1** (1821) 368.

PHILIPPINES (1992 *Cuming*) fide Berk. Lond. Journ. Bot. **1**: 149.

Polystictus versatilis (Berk.) Fr. Nov. Act. Soc. Sci. Ups. III. **1** (1855) 93. *Trametes versatilis* Berk. Lond. Journ. Bot. **1** (1842) 150. *Polyporus versatilis* Berk. Gaud.-Beaupr. Voy. Bonite **1** (1846) 182. *pl. 138 f. 1.*

LUZON, Manila, on trunks (Herb. Mus. Paris) fide Lév. in Gaud.-Beaupr. Voy. Bonite l. c. Province of Isabela (*Warburg*) fide Henn. Hedw. **32**: 220. NEGROS (*Usteri*) fide Henn. in Usteri Beitr. 136. Philippines (2026 *Cuming*) fide Berk. l. c.

Polystictus xanthopus Fr. Nov. Act. Reg. Soc. Sci. Ups. III. **1** (1855) 74. *Polyporus xanthopus* Fr. Obs. **2** (1818) 255; Rel. Afz. (1860) *pl. 3. f. 6.*

LUZON, Province of Bataan (3498 *Merrill*) October, 1903, on fallen logs; Province of Isabela (*Warburg*) fide Henn. Hedw. **32**: 221. LUZON (*Loher*) fide Massee Kew Bull. (1899) 176; Manila, fide Lév. in Gaud.-Beaupr. Voy. Bonite **1**: 175. PALAWAN, E-wi-ig River (3588 *Merrill*) February, 1903. PHILIPPINES (2032, 2033, 2039 *Cuming*) fide Berk. Lond. Journ. Bot. **1**: 147.

This may be a synonym of *Microporus perula* Beauv.

PYCNOPORUS Karst.

Pycnoporus sanguineus (L.) Nees Esseq. (1818) 304. *Boletus sanguineus* Linn. Sp. Pl. ed. 2 (1763) 1646. *Polystictus sanguineus* Fr. Nov. Act. Reg. Soc. Sci. Ups. III. **1** (1855) 74

LUZON (*Loher*) fide Massee in Kew Bull. (1899) 176: Province of Tarlac (3601 *Merrill*) November, 1903: Province of Isabela (*Warburg*) fide Henn. Hedw. **32**:

220: Manila, fide Klotz. Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 235. NEGROS (*Usteri*) fide Henn. in Usteri Beitr. (1905) 136. PHILIPPINES (2029, 2040 *Cuming*) fide Berk. Lond. Journ. Bot. **1**: 149.

TRAMETES Fries.

Trametes beyrichii Fr. Epicr. (1838) 491. *Polyporus beyrichii* Fr. Linnaea **5** (1830) 518.
PHILIPPINES (2022 *Cuming*) fide Berk. Lond. Journ. Bot. **1** (1842) 151.

Trametes incana Lév. Ann. Sci. Nat. III. **2** (1844) 196. *Polyporus incanus* Lév. in Gaud.-Beaupr. Voy. Bonite **1** (1846) 138. *pl. 137. f. 2.*
LUZON, Manila, on trunks (*Gaudichaud*) fide Lév. l. c.

AGARACALES.

AGARICUS Linn.

Agaricus (Psalliota) argyrostectus Copel. Ann. Myc. **3** (1905) 27; Govt. Lab. Publ. **28** (1905) 144.
MINDANAO, Davao (*Copeland*) in open pastures.

Agaricus (Psalliota) boltoni Copel. ll. cc. 27, 144, last reference with plate.
MINDANAO, Davao (*Copeland*) in open pastures.

Agaricus (Psalliota) merrillii Copel. ll. cc. 27, 144, last reference with plate.
LUZON, Manila (*Copeland*) terrestrial under trees.

Agaricus (Psalliota) manilensis Copel. ll. cc. 28, 145.
LUZON, Manila (*Copeland*) in lawns.

Agaricus (Psalliota) perfuscus Copel. ll. cc. 28, 145.
LUZON, Manila (*Copeland*) in shaded ground.

Agaricus (Psalliota) philippinensis Berk Lond. Journ. Bot. **1** (1842) 144.
PHILIPPINES (1981 *Cuming*) fide Berk. l. c. (Not in Sacc. Syll. Fung.)

COPRINUS Pers.

Coprinus ater Copel. Ann. Myc. **3** (1905) 25; Govt. Lab. Publ. **28** (1905) 142.
MINDANAO, Davao (*Copeland*) on horse manure.

Coprinus bryanti Copel. ll. cc. 26, 142.
NEGROS (*Copeland*) on dead trunks of *Ficus*.

Coprinus concolor Copel. ll. cc. 26, 142.
MINDANAO, District of Davao, Todaya (*Copeland*) terrestrial in forest.

Coprinus confertus Copel. ll. cc. 25, 142, the last reference with plate.
LUZON, Manila (*Copeland*) on horse manure.

Coprinus ornatus Copel. ll. cc. 25, 142.
NEGROS, Gimagon River (*Copeland*) on wood in chip yard.

Coprinus pseudo-plicatus Copel. ll. cc. 27, 143.
LUZON, Manila (*Copeland*) on horse manure and decaying leaves.

Coprinus revolutus Copel. ll. cc. 26, 143.
LUZON, Manila (*Copeland*) on manure.

Coprinus rimosus Copel. ll. cc. 26, 143.
LUZON, Manila (*Copeland*) on horse manure.

Coprinus volutus Copel. ll. cc. 26, 143.
LUZON, Manila (*Copeland*) on decaying leaves.

LENTINUS Fries.

Lentinus badius (Berk.) Sacc. Syll. Fung. **5** (1887) 592. *Panus badius* Berk. Lond. Journ. Bot. **1** (1842) 145.
PHILIPPINES (1983 *Cuming*) fide Berk. l. c.

Lentinus sajor-caju Fr. Epicr. (1838) 393. *Agaricus sajor-caju* Fr. Syst. Myc. **1** (1821) 175; Rumph. Herb. Amb. 125. *pl. 56. f. 1.*
LUZON (*Warburg*) fide Henn. Hedw. **32:** 221.

Lentinus setiger Lév. Ann. Sci. Nat. III. **2** (1844) 176; Gaud.-Beaupr. Voy. Bonite **1** (1846) 170 *pl. 136. f. 4.*
LUZON, Manila, on trunks (Herb. Mus. Paris) fide Lév. l. c.

Lentinus strigosus (Schw.) Fr. Elench. **1** (1828) 47. *Agaricus strigosus* Schw. Schrift. Natur. Ges. Leipzig **1** (1822) 89.
LUZON, Province of Isabela (*Warburg*) fide Henn. in Warb. Mons. **1:** 16.

LEPIOTA Fries.

Lepiota candida Copel. Ann. Myc. **3** (1905) 29; Copel. Govt. Lab. Publ. **28** (1905) 146.
LUZON, Manila (*Copeland*) open grass lands.

Lepiota chlorospora Copel. ll. cc. 28, 145.
LUZON, Manila (*Copeland*) in lawns.

Lepiota elata Copel. ll. cc. 29, 146.
LUZON, Manila (*Copeland*) in manured lawns.

Lepiota manilensis Copel. ll. cc. 29, 145.
LUZON, Manila (*Copeland*) on ground under *Pithecolobium* and *Terminalia.*

PANAEOLUS Fries.

Panaeolus panaiensis Copel. Ann. Myc. **3** (1905) 27; Govt. Lab. Publ. **28** (1905) 144.
PANAY, Capiz (*Copeland*) on horse manure.

Panaeolus pseudo-papilionaceus Copel. ll. cc. 27, 144.
LUZON, Manila (*Copeland*) on manured ground.

PANUS Fries.

Panus connatus (Berk.) Sacc. Syllog. Fung. **5** (1887) 615. *Lentinus* (*Scleroma*) *connatus* Berk. Lond. Journ. Bot. **1** (1842) 145.
PHILIPPINES (1993 *Cuming*) fide Berk. l. c.

PLEUROTUS Fries.

Pleurotus noctileucens (Lév.) Sacc. Syll. Fung. **5** (1887) 358. *Agaricus noctileucens* Lév. Ann. Sci. Nat. IV. **2** (1844) 171.
LUZON, Manila on trunks (Herb. Mus. Paris) fide Lév. l. c.

SCHIZOPHYLLUM Fries.

Schizophyllum alneum (Linn.) Schrot. Cohn. Krypt. Fl. Schles. **3** (1887) 383. *Agaricus alneus* Linn. Sp. Pl. (1753) 1176.
LUZON, Province of Bataan, Lamao (3527 *Merrill*) October, 1903. NEGROS (*Usteri*) fide Henn. in Usteri Beitr. 136.

XEROTUS Fries.

Xerotus fuliginosus B. & C. Proc. Am. Acad. 4 (1857) 121.
LUZON, Province of Bataan, Lamao (3497 *Merrill*) October, 1903.

PHALLALES.

DICTYOPHORA Desv.

Dictyophora phalloidea campanulata Fisch. Hedw. 32 (1893) 222.
MINDANAO, Davao (*Warburg*) fide Henn. in Warb. Mons. 1: 22.

Dictyophora speciosa Mey. Nov. Act. Acad. Nat. Cur. 19 (1843) Suppl. 239 *pl. 6.*
LUZON, on ground, fide Meyen, l. c.

LYCOPERDALES.

GEASTER Micheli.

Geaster fimbriatus Fr. Syst. Myc. 3 (1829) 16.
MINDANAO, Davao (*Warburg*) fide Henn. Hedw. 32: 222.

LYCOPERDON Tourn.

Lycoperdon todayense Copel. Ann. Myc. 3 (1905) 25; Govt. Lab. Publ. 28 (1905) 141.
MINDANAO, District of Davao, Todaya (*Copeland*) on ground under *Musa* sp.

NIDULARIALES.

CYATHUS Haller.

Cyathus montagnei Tul. Ann. Sci. Nat. II. 1 (1844) 70. *pl. 4. f. 9–10.*
MINDANAO, Davao (*Warburg*) fide Henn. in Warb. Mons. 1: 24.

SCLERODERMATALES.

TULOSTOMA Pers.

Tulostoma pusillum Berk. Lond. Journ. Bot. 1 (1842) 157. *pl. 7. f. 10.*
PHILIPPINES (1981 *Cuming*) fide Berk. l. c.

Tulostoma wightii Berk. Lond. Journ. Bot. 1 (1842) 157.
PHILIPPINES (*Cuming*, presumably, but without collector given) fide Berk. l. c.

DEUTERONYCETÆ.

SPHAEROPSIDALES.

ASCHERSONIA Mont.

Aschersonia cinnabarina P. Henn. in Warb. Mons. 1 (1900) 37. *pl. 1. f. 20.*
LUZON, Province of Rizal (Manila) on *Glochidion* sp. (*Warburg*) fide Henn. l. c.

Aschersonia confluens P. Henn. in Warb. Mons. 1 (1900) 37.
LUZON, Province of Rizal (Manila) on *Leucosyke* sp. (*Warburg*) fide Henn. l. c.

SEPTORIA Fries.

Septoria molleriana Bres. Rev. Myc. **13** (1891) 68.

LUZON, Province of Zambales, Iba (3609 *Merrill*) on *Canavalia obtusifolia*, June, 1902. Probably this species but not in condition for absolute identification.

MONILIALES.

ALTERNARIA Nees.

Alternaria solani (E. & M.) Sorauer Zeitsch. Pfl. Krankh. **6** (1896) 6. *Macrosporium solani* E. & M. Am. Nat. **16** (1882) 1003.

LUZON, Province of Benguet, La Trinidad (*W. S. Lyon*) on *Solanum tuberosum* March, 1906.

FUSARIUM Link.

Fusarium paspalicola P. Henn. in Warb. Mons. **1** (1900) 38.

MINDANAO, Davao (*Warburg*) on *Paspalum*, fide Henn. l. c.

ISARIA Pers.

Isaria sphingum Schw. Schrift. Naturf. Gesell. Leips. **1** (1822) 126.

LUZON, Manila (*Loher*) on undetermined larvæ, fide Massee, Kew Bull. 196.

RAMULARIA Unger.

Ramularia catappae Racib. Paras. Alg. & Pilz. Java. **2** (1900) 41.

LUZON, Manila, on *Terminalia catappa* (3610 *Merrill*) July, 1902. Probably this species but not in condition for positive identification.

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HENNINGS, P. Fungi, in Warburg, *Monsunia* **1** (1900) 1–38.

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KLOTZSCH, J. F. Fungi in F. J. Meyen Beitrage zur Botanik, *Nov. Act. Acad. Caes. Leop.-Carol. Nat. Cur.* **19** (1843) Suppl. **1**: 233–246.

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—— Champignons in Gaud.-Beaupr. Voy. Bonite, **1** (1846) 164–204.

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MONTAGNE, CAMILLE. Plantes Cellulaires exotiques nouvelles. Dec. V–VIII. *Ann. Sci. Nat.* II. **18** (1842) 241–242.

NEES VON ESENBECK, F. Fungi, in Presl Reliquiae Haenkeanae **1** (1830) 1.

SYDOW, H. ET P. Neue und kritische Urendineen, IV. *Ann. Myc.* **4** (1906) 28–32.

LIST OF PHILIPPINE FUNGI ENUMERATED BY BERKELEY, JOURN. LINN. SOC. BOT. 16 (1878), PP. 45 TO 48, OVERLOOKED BY MR. RICKER.

Lentinus leveillei Berk.
Lentinus abnormis Berk.
Lentinus exilis Kl.
Schizophyllum commune N.
Polyporus (*Mesopus*) *xanthopus* Fr.
Polyporus (*Mesopus*) *grammocephalus* Berk.
Polyporus (*Pleuropus*) *affinis* Nees.
Polyporus (*Pleuropus*) *lucidus* Fr.
Polyporus (*Pleuropus*) *gibbosus* Nees.
Polyporus (*Pleuropus*) *sanguineus* Fr.
Polyporus (*Anodermei*) *laeticolor* Berk.
Polyporus (*Anodermei*) *ostreaeformis* Berk.
Polyporus (*Placodermei*) *zonalis* Tr.
Polyporus (*Placodermei*) *zonalis* var. *semilaccatus* Berk.
Polyporus (*Placodermei*) *calignosus Berk.*
Polyporus (*Placodermei*) *senex* Mont.
Polyporus (*Placodermei*) *endotheius* Berk.
Polyporus (*Placodermei*) *ignarius.*
Polyporus (*Placodermei*) *pectinatus* Klotz.
Polyporus (*Inodermei*) *caperatus* Berk.
Trametes conchatus Berk.
Trametes mollis Fries.
Trametes occidentalis Fries.
Hexagona crinigera Fries.
Hexagona albida Berk.
Hexagona flabelliformis Berk.
Hexagona cladophora Berk.
Favolus scaber Berk.
Favolus scaber Berk. var. *platyporus* Berk.
Irpex zonatus Berk.
Stereum ostrea Nees.
Stereum moselei Berk.
Xylaria hypoxylon Grev.

NEW PHILIPPINE ASCLEPIADACEÆ.

By R. Schlechter.
(*Berlin, Germany.*)

TOXOCARPUS W. et A.

Toxocarpus Merrillii Schltr. sp. nov.

Terrestris, ramosa, alte scandens; ramis ramulisque filiformibus elongatis, flexuosis, minute puberulis vel subglabris, bene foliatis; foliis petiolatis, patentibus patulisve late oblongis, apiculatis, superne lucidis, glabris, subtus pallidioribus, brevissime et molliter ferrugineo-pubescentibus, 6–8 cm. longis, medio fere 4–6.3 cm. latis, petiolo minute puberulo, circ. 1.5 cm. longo; cymis ramosis sublaxae multifloris, breviter ferrugineo tomentosulis petiolo fere duplo longioribus; floribus in genere mediocribus; calycis segmentis ovatis, obtusis, ferrugineo-tomentosulis, circ. 0.3 cm. longis; corollae tubo campanulato, extus glabro, intus sparsim puberulo, fauce barbato, calycem vix excedente, lobis linearibus, obtusiusculis, utrinque glabris, circ. 0.5 cm. longis; coronae foliolis rhomboideo-lanceolatis, subacutis, glabris, antheram quarto parte fere superantibus; antheris oblongo-quadratis, marginibus cartilagineis valde angustis, appendice hyalina ovata, subacuta. Stigmatis capite alte rostrato, rostro cylindrico subacuto, in tubo corollae incluso.

Luzon, Province of Rizal, Bosoboso (2810 *Merrill*) July, 1903.

Readily distinguished from all other Philippine species of this genus by its broad leaves, which are glabrous above, and by its flower characters.

GYMNEMA R. Br.

Gymnema pachyglossum Schltr. sp. nov.

Volubile, alte scandens, ramosum; ramis ramulisque elongatis, flexuosis, teretibus, primum minute puberulis, demum glabratis, bene foliatis; foliis petiolatis ovatis vel ovato-ellipticis, acuminatis, utrinque glabris, 5–7 cm. longis, medio vel infra medium 2.3–4.6 cm. latis, petiolo 1–1.5 cm. longo; cymis subaxillaribus, vulgo oppositis, breviter pedunculatis, umbelliformibus, densifloris, vulgo petiolo aequilongis nunc paullo longioribus; floribus in genere inter minores, illis *G. Schlechteriani* Warb. similibus et fere aequimagnis, flavis, odoratis; pedicellis brevibus circ. 0.2 cm. longis, minute puberulis; calycis segmentis suborbicularibus obtusis, margine minute ciliatis, extus sparsissime puberulis, 0.1 cm. longis; corollae tubo late campanulato, calyci aequilongo, extus glabro, intus minute et sparsim puberulo, lobis oblongis obtusis utrinque glabris, patentibus, tubo vix longioribus; coronae foliolis in sinubus corollae carnosis, facie oblongis apice uncinato incurvulis; gynostegio in tubo corollae incluso; antheris oblongis, appendice hyalina semiorbiculari, obtusissima; pollinii oblique oblongoideis, subsessilibus, retinaculo oblongoideo, polliniis plus duplo minore; stigmatis capite obtuso.

LUZON, Province of Bataan, Lamao River (3291 *Merrill*) October, 1903; Province of Rizal, Bosoboso (1898 *Ahern's collector*) October, 1904.

Allied to *Gymnema Schlechterianum* Warb., but well distinguished by its corona.

TYLOPHORA R. Br.

Tylophora Elmeri Schltr. sp. nov.

Volubilis, alte scandens, ramosa, ramis ramulisque filiformibus elongatis, teretibus, subglabris, laxe foliatis, flexuosis; foliis petiolatis erecto-patentibus, lanceolatis vel anguste oblongis, acuminatis vel apiculatis, utrinque glabris, textura coriaceis, subtus reticulato-nervosis, 3–6 cm. longis, infra medium 0.8–2.2 cm. latis, petiolo teretiusculo 0.3–1 cm. longo; cymis perlaxis, plurifloris, usque ad 8 cm. longis, pedicellis gracillimis filiformibus, glabris, circ. 0.8 cm. longis; floribus illis *T. silvaticae* Dcne. fere aequimagnis, ut videtur purpureis; calycis segmentis ovatis acutiusculis, glabris, 0.1 cm. longis; corolla subrotata, alte 5-lobata, lobis oblongis extusis, extus glabris, intus minutissime papillosis, 0.2 cm. longis; coronae foliolis carnosis, tubo gynostegii usque ad apicem adnatis late ovoideis, obtusis, basi truncato-obtusatis, basin antherarum attingentibus; antheris quadratis, marginibus cartilagineis bene conspicuis utrinque truncatis, appendice hyalina semiorbiculari; polliniis late oblongoideis obliquis, translatoribus tenuibus duplo brevioribus retinaculo oblongoideo fere aequilongis.

LUZON, Province of Benguet, Baguio (5980 *Elmer*) March, 1904.

The affinity of this species is with *Tylophora tenuis* Bl., but the leaves are longer and narrower and the flowers larger. Externally it closely resembles *T. luzonica* Schltr.

Tylophora luzonica Schltr. sp. nov.

Volubilis, scandens, ramosa, ramis ramulisque filiformibus elongatis, flexuosis, glabris vel subglabris, laxe foliatis; foliis petiolatis patentibus vel erecto-patentibus lanceolato-oblongis, apiculatis vel breviter acuminatis, glabris, textura coriaceis, 2.4–4.5 cm. longis, infra medium 0.9–1.7 cm. latis, petiolo 0.3–0.8 cm. longo; cymis elongatis, perlaxe plurifloris usque ad 13 cm. longis, pedicellis gracillimis filiformibus, sparsim pilosulis, 0.4 cm. longis; floribus illis *T. Elmeri* Schltr. simillimis aequimagnisque; calycis segmentis minute et sparsim pilosulis, margine ciliatis, ovatis, obtusiusculis, corollae fere duplo brevioribus; corolla subrotata alte 5-fida, lobis oblongis obtusis apice minute excisis, utrinque glabris, 0.2 cm. longis; coronæ foliolis triangulo-ovoideis obtusis basi truncato-rotundatis, usque ad apicem tubo gynostegii adnatis, basin antherarum attingentibus; antheris quadratis, marginibus cartilagineis bene conspicuis, appendice hyalina semiorbiculari obtussisima; polliniis oblique late oblongoideis, translatoribus tenuibus, fere triplo brevioribus, retinaculo oblongo, longitudine dimidium polliniorum excedente; folliculis gracilibus rostratis, circ. 5 cm. longis.

LUZON, Province of Union, Bauang (5585 *Elmer*) February, 1904.

Closely allied to *Tylophora Elmeri* Schltr., but well distinguished by the ciliate sepals and glabrous excised corolla lobes.

Tylophora Merrillii Schltr. sp. nov.

Terrestris, volubilis, alte scandens, ramosa; ramis ramulisque filiformibus elongatis, flexuosis, subglabris, laxe foliatis; foliis petiolatis erecto-patentibus patulisve ovato-oblongis acuminatis, utrinque glabris, textura papyraceis, 5.5–8 cm. longis, infra medium 3–5 cm. latis, petiolo subglabro 1.2–1.5 cm. longo; cymis gracillimis 6–8 cm. longis laxe multifloris; floribus fasciculatis, pedicellis gracillimis filiformibus sparsim pilosulis, 0.3–0.4 cm. longis, floribus in genere inter minores; calycis segmentis ovato-lanceolatis subacutis extus sparsim pilosulis, corollae fere duplo brevioribus; corolla subrotata alte 5-fida, lobis oblongis obtusis, apice breviter excisis, utrinque glabris, circ. 1.5 mm. longis; coronae foliolis usque ad apicem tubo gynostegii adnatis ovoideis obtusis, carnosis, basin antherarum subexcedentibus; antheris quadratis, marginibus cartilagineis bene conspicuis, appendice hyalina semiorbiculari obtusissima; polliniis oblongoideis, translatoribus tenuibus, plus duplo brevioribus, retinaculo oblongoideo poliniis duplo breviore; folliculo gracili rostrato, circ. 5 cm. longo.

LUZON, Province of Rizal, Caloocan (3648 *Merrill*) November, 1903. In thickets by roadsides near sea level.

An ally of *Tylophora luzonica* Schltr., and *T. excisa* Schltr., characterized by its larger and broader leaves and smaller flowers.

Tylophora Whitfordii Schltr. sp. nov.

Volubilis scandens ramosa, ramis ramulisque filiformibus elongatis, flexuosis subglabris, laxe foliatis; foliis patentibus patulisve, petiolatis, lanceolatis vel ovato-lanceolatis, acuminatis, 2.5–3.5 cm. longis, infra medium 1.2–1.5 cm. latis, utrinque glabris, textura pro genere tenuibus, petiolo 0.7–1 cm. longo; cymis laxe ramosis usque ad 8 cm. longis, laxe 10–20-floris; pedicellis filiformibus gracillimis circ. 0.5 cm. longis; floribus illis *T. tenuis* Bl., similibus et fere aequimagnis purpureis; calycis segmentis ovato-lanceolatis subacutis, extus sparsissime setosulis, margine haud ciliatis, corollae duplo brevioribus; corolla subrotata alte 5-fida, lobis oblongis obtusissimis utrinque glabris, 1.5 mm. longis; coronae foliolis tubo gynostegii omnino adnatis, carnosis, obtusis, basi subtruncato-obtusatis, basin antherarum paululo superantibus; antheris quadratis, marginibus cartilagineis utrinque truncatis, appendice hyalina semiorbiculari, obtusissima; stigmatis capite depresso.

LUZON, Province of Tayabas, Gumaca (898 *Whitford*) September, 1904. In the Nipa formation at sea level.

An ally of *Tylophora tenuis* Blume. Unfortunately the material is rather scanty and not in good state of preservation, no pollinia being found.

CONCHOPHYLLUM K. Sch.

Conchophyllum Copelandii Schltr. sp. nov.

Epiphyticum, scandens ramosum; caule ramisque elongatis flexuosis, laxe foliatis, teretibus, glabris; foliis petiolatis oblongo-ellipticis, obtusis, basi cuneatis glabris, textura crasse coriaceis, 5–7 cm. longis, 1.8–2.7 cm. medio fere latis, petiolo carnoso 1–1.5 cm. longo; cymis pedunculatis vulgo dichotomis, rhachi incrassata demum cylindrica, pedunculo petiolo fere aequilongo vel paullo longiore; floribus in seriebus umbellatis illis *C. imbricati* Bl., similibus et aequimagnis, breviter pedicellatis; calycis segmentis ovatis, obtusis, glabris, circ. 0.1 cm. longis; corolla ampullacea circ. 0.4 cm. longa, tubo subgloboso circ. 0.3 cm. diametiente glabro, intus fauce lamella annulari quinquelobata donato, e buccis 5 obtusis basi puberulis cum lobis corollae alternantibus ornato; corollae lobis ovato oblongis obtusiusculis glabris, intus medio carinato-incrassatis; gynostegio conico; antheris dorso medio vesicato, vesiculo basi bilobato, appendice hyalina oblonga, obtuso; poliniis oblique oblongoideis, translatoribus clavatis poliniis fere duplo brevioribus, retinaculo rhomboideo translatoribus longiore.

MINDANAO, Davao (337, 340, 388 *Copeland*) March, 1904, epiphytic and symbiotic with ants.

A very distinct species, differing from all the others in the genus by its leaves and anthers. The latter are thickened in the middle at the back into a bilobed bladder-like callosity.

DISCHIDIA R. Br.

Dischidia Copelandii Schltr. sp. nov.

Epiphytica, dependens, gracilis, ramosa; caule ramisque elongatis, filiformibus, flexuosis, glabris, bene foliatis, radicantibus; foliis patentibus breviter petiolatis ovato-orbicularibus vel ovatis, breviter acutis vel apiculatis, glabris, textura carnosis, 0.8–1.2 cm. longis, medio fere 0.6–1 cm. latis, petiolo perbrevi; cymis subsessilibus plurifloris; floribus breviter pedicellatis illis *D. Ridleyanae* Schltr. similibus et fere aequimagnis; calycis segmentis ovato-oblongis, obtusis, glabris, 0.5 mm. longis; corolla subglobosa, circ. 0.2 cm. diametiente apice brevieter 5-lobulata, tubo globoso fauce barbellato excepto glabro, intus nudo, lobulis erectis ovato-triangulis acutis intus incrassatis glabris; coronae foliolis linearibus erectis tertia parte apicali bibrachiatis, brachiis divergentibus falcato deflexis, linearibus, obtusis; gynostegio conico foliola coronae paulo excedente; antherarum appendice hyalino oblongo obtuso; poliniis oblique oblongoideis, translatoribus oblique cuneatis poliniis paulo brevioribus, retinaculo oblongoideo translatoribus fere duplo breviore.

MINDANAO, Davao (521 *Copeland*) March, 1904. Pendant in large bunches.

This is one of the species which has evidently been regarded as one of the forms of *Dischidia nummularia* R. Br., a species of North Australia. Its nearest ally is *D. Ridleyana* Schltr., from Singapore.

Dischidia Merrillii Schltr. sp. nov.

Epiphytica in truncis arborum, gracilis, pauciramosa, decumbens vel dependens; caule ramisque filiformibus elongatis, teretibus, puberulis, radicantibus, laxe foliatis; foliis petiolatis, patentibus patulisve lanceolato-ellipticis, acuminatis, glabris, textura coriaceis, 4–5 cm. longis, medio fere 1.5–2.3 cm. latis, petiolo tereti glabro, circ. 0.5 cm. longo; cymis paucifloris breviter pedunculatis pedunculo circ. 0.5 cm. longo, pedicellis tenuibus circ. 1.5 mm. longis; floribus in genere inter mediocres, lilacinis; calycis segmentis ovato-oblongis, obtusis, glabris, 0.1 cm. longis; corolla cylindracea basin versus paulo ampliato, breviter 5-lobulata, lobulis late ovatis obtusiusculis, annulo pilorum erectorum in fauce et intus in medio tubi; coronae foliolis e basi paulo dilatata linearibus, apice peltato-dilatatis bipartitis, partitionibus oblique ovatis patulis, parte basilari bene brevioribus; gynostegio cylindraceo apice conico, appendice hyalino antherarum e basi oblonga acuminata; poliniis oblique oblongoideis, translatoribus oblique cuneatis poliniis fere triplo brevioribus, retinaculo minuto.

LUZON, Province of Pampanga, Mount Arayat (3904 *Merrill*) October, 1904. At and near the summit of the mountain in the slightly developed mossy forest.

A species related to *Dischidia hirsuta* Wall., but well distinguished by the small differently shaped flowers and larger thinner leaves.

Dischidia myrtillus Schltr. sp. nov.

Epiphytica in arboribus, ramosa; caule ramisque radicantibus elongatis flexuosis, teretibus, dense granulosis, dense foliatis; foliis erecto-patentibus ovato-lanceolatis vel ovato-ellipticis, acuminatis, glabris, textura coriaceis, 1–1.8 cm. longis, medio vel infra medium 0.6–0.9 cm. latis, petiolo perbrevi; cymis paucifloris subsessilibus, pedicellis tenuibus glabris, circ. 1.5 mm. longis; calycis segmentis oblongis obtusis sparsim ciliatis, longitudine 0.1 cm. haud attingentibus; corolla ampullacea illae *D. Ridleyanae* Schltr. simili, paulo majore, 0.3 cm. longa, tertia parte apicali 5-lobata, tubo subgloboso, 0.2 cm. longo, glabro, fauce pilis deflexis barbellato, lobis erectis ovato-oblongis obtusiusculis intus incrassatis glabris; coronae foliolis e basi lineari bibrachiatis, brachiis linearibus divaricatis, dimidio anteriore oblique oblongo-dilatatis obtusis, parte basilari brachiis aequilonga; gynostegio conico foliola coronae paulo excedente; antherarum appendice oblongo-obtuso; poliniis oblique oblongoideis, translatoribus subduplo brevioribus oblique cuneatis retinaculo rhomboideo, translatoribus subduplo breviore; folliculis gracilibus, rostratis, glabris, circ. 3.5 cm. longis, infra medium circ. 0.2 cm. diametientibus.

LUZON, Province of Benguet, Sablan (6256 *Elmer*) April, 1904; Province of Pampanga, Mount Arayat (3838 *Merrill*) May, 1904, summit at about 830 m.

Distinguished from all other species of the genus by its dense leaves. In shape, the leaves resemble most those of *Dischidia ruscifolia* Bl.

Dischidia platyphylla Schltr. sp. nov.

Epiphyticum in ramis truncisque arborum decumbens vel dependens, parum ramosa; caule ramisque filiformibus elongatis, flexuosis, teretibus, glabris, laxe foliatis, glaucis; foliis patentibus, sessilibus, reniformibus, obtusissimis, glabris, textura carnosis, 2–3 cm. longis, medio fere 3–4 cm. latis, glaucis; cymis capitiformibus abbreviatis, congestifloris, pedunculo tereti, glabro, 3–4 cm. longo; floribus subgloboso ovoideis, illis *D. Rafflesianae* Wall. fere aequimagnis; calycis segmentis ovatis obtusis, glabris, longitudine vix 0.1 cm. excedentibus; corolla subgloboso-ovoidea apice breviter 5-lobata, tubo utrinque glabro, infra medium 0.3 cm. diametiente, faucem versus mox constricto, 0.3 cm. longo, lobis minutis, circ. 0.1 cm. longis, erectis, ovato-triangulis subacutis, carnosis intus infra medium pilis deflexis barbatulis, annula squamularum basi decemlobato, apice quinque lobato in fauce; coronae foliolis e basi lineari bibrachiatis, brachiis divergenti-patulis linearibus, apice bifidis, segmenta superiore semiovata, inferiore lineari aequilonga, parte basilari foliolorum brachiis aequilonga; gynostegium conicum, coronum excedente; appendicibus antherarum hyalinis ovatis acutis; poliniis oblique obovoideis, translatoribus oblique cuneatis, poliniis duplo brevioribus, retinaculo minuto rhomboideo.

MINDANAO, Davao (338 *Copeland*) March, 1904.

This species is well distinguished by its corona scales; in habit it somewhat resembles *Dischidia Collyris* Wall.

Dischidia rosea Schltr. sp. nov.

Epiphytica, decumbens vel dependens, pauci ramosa; caule ramisque radicantibus elongatis flexuosis subglabris, teretibus, laxe foliatis; foliis patentibus lanceolato-ellipticis acuminatis utrinque glabris, textura coriaceis, 3.5–5.5 cm. longis, infra medium 1.5–2 cm. latis, petiolo tereti, subglabro, 0.3–0.5 cm. longo; cymis extra-axillaribus breviter pedunculatis, subumbellato-plurifloris, pedunculo tereti petiolo fere aequilongo, pedicellis tenuibus circ. 0.2 cm. longis; floribus illis *D. hirsutae* Wall. similibus et aequimagnis, roseis; calycis segmentis ovatis obtusiusculis glabris, 1.5 mm. longis; corolla ampullacea 0.7 cm. longa tubo faucem versus conspicue attenuato extus glabro, intus infra medium et fauce annulo pilorum erectorum ornato, lobis ovatis, obtusiusculis, minutis, utrinque glabris; coronae foliolis erectis e basi ovata angustatis, apice peltato-dilatis, bipartitis, partitionibus oblique ovatis patulis, parte basilari multo brevioribus; gynostegio foliola coronae vix duplo excedente, cylindraceo apice conico; antherarum appendice hyalino, oblongo acuto;

polliniis oblique oblongoideis, translatoribus oblique cuneatis polliniis fere triplo brevioribus, retinaculo oblongoideo tamen paulo longioribus.

LUZON, Province of Benguet, Baguio (5838 *Elmer*) March, 1904.

Like *Dischidia Merrillii* Schltr., related to *D. hirsuta* Wall., but distinguished from the former by the shape of the corolla and from the latter by its leaf characters.

HOYA R. Br.

Hoya benguetensis Schltr. sp. nov.

Epiphytica, volubilis, scandens, ramosa; caule ramisque filiformibus elongatis, flexuosis, teretibus, glabris, laxe foliatis; foliis ellipticis vel ovato-ellipticis acuminatis, glabris, textura crasse coriaceis, nervis primariis 5 bene conspicuis, 6–10 cm. longis, medio vel infra medium 2.5–4 cm. latis, petiolo brevi carnoso, 0.5–0.8 cm. longo; cymis umbelliformibus multifloris, rhachis demum cylindrica elongata, pedunculo nunc brevi nunc usque ad 7.5 cm. longo, pedicellis filiformibus gracilibus, glabris, 1–1.3 cm. longis; floribus ut videtur rubidis in genere mediocribus; calycis segmentis ovatis obtusis glabris, vix 0.2 cm. longis; corolla usque infra medium 5-fida rotata, extus glabra, intus minutissime et subinconspicuo farinoso-papillosa, circ. 1 cm. diametiente, lobis late ovatis, acutis, circ. 0.3 cm. longis; coronae foliolis subhorizontalibus, apice obtuse rostratis porrectis, dorso obtusis, superne usque infra apicem longitudinaliter carinatis, subtus sulcatis; poliniis oblique clavatis translatoribus brevissimis, retinaculo rhomboideo.

LUZON, Province of Benguet, Baguio (5979 *Elmer*) March, 1904.

A species in leaf characters somewhat resembling *Hoya camphorifolia* Warb., but well distinguished from that species by its flowers, which are apparently reddish.

Hoya bilobata Schltr. sp. nov.

Epiphytica, ramosa, ramis caulibusque elongatis, teretibus, puberulis, bene foliatis; foliis brevissime petiolatis late ellipticis vel suborbicularibus, obtusis, glabris, textura coriaceis, 1.7–2.2 cm. longis, medio fere 1.3–1.8 cm. latis, petiolo circ. 0.3 cm. longo, carnoso; cymis umbelliformibus, circ. 20-floris, pedunculo tereti, glabro, 1–3 cm. longo, pedicellis filiformibus glabris, usque ad 0.8 cm. longis; floribus in genere inter minimos; calycis segmentis oblongis obtusis glabris, longitudine vix 0.1 cm. attingentibus; corolla rotata usque ad medium fere 5-lobata, extus glabra, intus breviter et dense papillosa, lobis decurvulis ovatis obtusiusculis, circ. 1.5 mm. longis; coronae foliolis apicem versus adscendentibus obtuse rostratis, dorso obtusis superne medio callo oblongo donatis, auriculis 2 supra apicem dorsalem longius productis; anthera apicem foliola vix excedente; poliniis oblongoideis, translatoribus perbrevibus, retinaculo minuto rhomboideo fere aequilongis.

MINDANAO, Davao (420 *Copeland*) March, 1904.

The smallest *Hoya* yet known from the Philippines. It is well distinguished by the corona scales, which are produced at the back into two rather large lobes.

These lobes are in reality nothing but the otherwise simply recurved sides of the horizontal corona scales, which in the case of the above species are produced beyond the dorsal apex of the scale itself.

Hoya Bordenii Schltr. sp. nov.

Epiphytica in ramis arborum, ramosa; ramis caulibusque filiformibus elongatis, flexuosis, glabris, laxe foliatis; foliis patulis lanceolato-oblongis vel anguste ellipticis, acuminatis, glabris, textura coriaceis, 11–18 cm. longis, medio vel infra medium 2.5–4.5 cm. latis, petiolo carnoso brevi 1.5–2 cm. longo; cymis umbelliformibus pedunculatis, pedunculo 3–5 cm. longo tereti, glabro, pedicellio filiformibus gracillimis glabris, 2.7 cm. longis; floribus illis *H. parasitica* Wall. fere aequimagnis, roseis; calycis segmentis ovatis obtusiusculis basin versus sparsissime puberulis, circ. 1.5 mm. longis; corolla rotata circ. 1 cm. diametiente, usque infra medium 5-lobata, extus glabra, intus minute et sparsim granuloso-papillosa, lobis ovatis acutis; coronae foliolis horizontalibus superne anguste ellipticis, apice anteriore et posteriore subacutis, medio gibbo lineari breviore longitudinaliter donato, subtus longitudinaliter foveolata; anthera apicem anteriorem folioli paululo excedente, marginibus cartilagineis angustatis falcatis; poliniis oblique oblongoideis, translatoribus brevissimis, retinaculo rhomboideo parvulo.

LUZON, Province of Bataan, Mount Mariveles (1213 *Borden*) June, 1904. In forests at 650 m.

Evidently one of the species of the *Hoya parasitica* Wall., group, and closely related to that species. However, it can be readily recognized by its long leaves and rather narrow straight corona scales.

Hoya McGregorii Schltr. sp. nov.

Epiphytica alte scandens, ramosa; caulibus ramisque filiformibus elongatis, flexuosis glabris, radicantibus, laxe foliatis; foliis patentibus patulisve, lanceolato-ellipticis, acuminatis, glabris, textura coriaceis 7–11 cm. longis, medio fere 2.5–3.5 cm. latis, petiolo teretiusculo carnoso, 1–1.5 cm. longo; cymis pedunculatis, umbelliformibus, multifloris, pedunculo tereti, glabro, circ. 4 cm. longo, pedicellis gracilibus filiformibus, 1.3–1.8 cm. longis, glabris; floribus illis *H. Merrillii* Schltr. similibus et fere aequimagnis, roseis; calycis segmentis ovatis obtusis, glabris, circ. 0.1 cm. longis; corolla rotata, circ. 0.6 cm. diametiente, usque infra medium 5-lobata, extus glabra, intus lobis marginem versus minute granuloso-papillosis, caeterum glabra, lobis ovato-triangulis, acuminatis; coronae foliolis superne obovatis apice anteriore breviter rostratis, apice posteriore breviter excisis, bucca parvula infra apicem anteriorem, subtus longitudinaliter foveolatis; antheris foliolum paululo excedentibus, marginibus cartilagineis falcatis; poliniis oblique clavatis, translatoribus perbrevibus, retinaculo minuto oblongoideo.

MINDORO, Baco River (191 *McGregor*) April–May, 1905.

An ally of *Hoya Merrillii* Schltr., but distinguished from that species by its corona scales.

Hoya mindorensis Schltr. sp. nov.

Epiphytica, pauciramosa, caulibus ramisque radicantibus, teretibus, glabris, laxe foliatis; foliis patentibus patulisve oblanceolato-ellipticis, breviter acuminatis, glabris, textura coriaceis, 9–12 cm. longis, supra medium 3.5–4.5 cm. latis, petiolo teretiusculo carnoso, 2–2.5 cm. longo; cymis pedunculatis, umbelliformibus, multifloris, pedunculo tereti, glabro, circ. 2 cm. longo, pedicellis gracillimis filiformibus glabris, circ. 1.5 cm. longis; floribus in genere mediocribus; calycis segmentis ovatis, obtusis minute ciliatis, circ. 1.5 mm. longis; corolla circ. 0.9 cm. diametiente, recurvulata, usque infra medium 5-lobata, extus glabra, intus dimidio inferiore puberula, lobis pilis sparsis hispida, ovatis, obtusiusculis, basi utrinque obtuse auriculatis, apice auriculisque reflexis; coronae foliolis horizontalibus superne anguste ellipticis, apice anteriore acuminatis, apice posteriore acutis, medio longitudinaliter inter apices carina angusta donatis, subtus longitudinaliter foveolatis; anthera apicem folioli paululo excedente marginibus cartilagineis valde falcatis; poliniis oblongoideis, translatoribus linearibus, fere triplo brevioribus, retinaculo rhomboideo, lateraliter compressa, translatoribus paulo beviore.

MINDORO, Baco River (332 *McGregor*) April–May, 1905.

This species is very remarkable in the two auricles that exist between the corolla lobes. The pollinia too are rather unusual for the genus.

Hoya odorata Schltr. sp. nov.

Epiphytica, pauciramosa; ramis caulibusque teretibus glabris, plus minusve flexuosis, bene foliatis; foliis erecto-patentibus breviter petiolatis ellipticis vel lanceolato-ellipticis acuminatis glabris, lucidis, textura tenuiter coriaceis, 3.5–5 cm. longis, infra medium 1.3–2.2 cm. latis; floribus in umbellis paucifloris albis, odoratis, pedicellis filiformibus, tenuibus, glabris circ. 2 cm. longis; calycis segmentis lanceolato-oblongis obtusis, margine sparsim ciliatis, 0.2 cm. longis; corolla rotata, circ. 1.7 cm. diametiente, usque infra medium 5-lobata, extus glabra intus dimidio inferiore subinconspicue farinoso-papillosa, lobis ovato-triangulis acutis vel subacuminatis; coronae foliolis carnosis horizontalibus obovatis, apice anteriore acuta breviter adscendente, apice posteriore obtusissima superne medio gibbo longitudinaliter ornatis, subtus sulcatis, 0.4 cm. longis; anthera apicem anteriorum folioli haud excedente, marginibus cartilagineis falcatis; polliniis oblique oblongoideo-clavatis, translatoribus perbrevibus retinaculo parvulo rhomboideo brevioribus.

LUZON, Province of Bataan, Mount Mariveles (3202 *Merrill*) January, 1904. In the mossy forest at 1,300 m., rare.

A very distinct species with elliptical-lanceolate rather thin leaves and rather large flowers. The material is rather scanty and I have seen but two flowers; accordingly the inflorescence will have to be more fully described later when other material shall be available.

A NEW PHILIPPINE BURMANNIA.

By R. Schlechter.
(*Berlin, Germany.*)

Burmannia Clementis Schltr. sp. nov.

Saprophitica, pusilla, habitu *B. nepalensis* Wall., pallida, 3–8 cm. alta, aphylla; caule gracili, tereti, squamulis paucis dissitis acuminatis obsesso, glabro, stricto vel substricto, basi subflexuoso vulgo simplice 1-paucifloro; floribus flavescentibus in genere inter minores, illis *B. nepalensis* Wall. similibus, subsessilibus, glabris, late 3-alatis, alis infra apicem medio aequilatis; corolla ampullacea ovario incluso 3–3.5 mm. longa, lobis 3 majoribus, triangulis, acuminatis, intus margine leviter incrassatis, subinconspicue papillosis, lobis 3, minutis oblongis obtusiusculis dentiformibus; antheris sessilibus loculis divaricatis connectivo incrassato basi loculos haud excedente, apice in appendicem transversam medio excisam supra loculos breviter producto; stylo subulato brachiis stylo ipso duplo brevioribus; stigmatibus peltato-concavis antheras haud superantibus; seminibus fusiformibus.

Mindanao, Lake Lanao, Camp Keithley (21 *Mary Strong Clemens*) December, 1905, at about 800 m., in grass lands.

This little species is especially interesting as being the first endemic representative of the order to be found in the Philippines, although it is certain that other species will be found later in the region. It seems to be most closely related to *Burmannia nepalensis* Wall., but is well distinguished from that species by its anthers.

THE PHILIPPINE
JOURNAL OF SCIENCE

VOL. I DECEMBER 31, 1906 SUPPLEMENT V

AN ENUMERATION OF PHILIPPINE GRAMINEÆ WITH KEYS TO GENERA AND SPECIES.

By ELMER D. MERRILL.
(From the botanical section of the Biological Laboratory, Bureau of Science.)

INTRODUCTION.

In the present paper an attempt has been made to summarize our present knowledge of Philippine *Gramineæ*, 72 genera and 226 species and varieties being recognized, all, with the exception of a few species indicated in the text, based on specimens actually examined by the author and deposited in the herbarium of the Bureau of Science. The material on which this article is based has been received within the past four and one-half years, and collected within that time, with the exception of 53 specimens of Cuming's Philippine collection (1836–1840) received from the British Museum. In addition to the above 226 species and varieties admitted, 56 others are considered in my attempt to account for all the species that have been credited to the Philippines by various authors. These are enumerated under doubtful and excluded species following the genera or tribes to which they belong, and for the most part have been credited to the Philippines through errors in localization or identification by Cavanilles, Lagasca, Presl, and F.-Villar.

The descriptions of Philippine grasses are widely scattered in botanical literature, but from the fact that the present list will undoubtedly be considerably augmented in the near future, it has not been thought advisable to include descriptions of the species in the present paper, although short descriptions of the tribes and genera, and keys to the tribes, genera, and species have been compiled. An attempt has been made to make the paper complete so far as Philippine synonomy is concerned, to account for all the species credited to the Philippines by various authors, and to cite the most important literature references under each species.

Among the earliest species of Philippine grasses described are the few considered by Cavanilles in his "Icones et Descriptiones Plantarum," 1791–1801, and by Lagasca in his "Genera et Species Plantarum," 1816. These early Philippine species were based on material collected by members of the Malaspina expedition, but it is evident that in the case of both the above works a considerable number of plants credited to the Philippines were erroneously localized and were really from tropical America and not from this Archipelago. The next work discussing any considerable number of Philippine *Gramineæ* is Presl's "Reliquiae Haenkeanae," 1830, in which 56 species of Philippine, or supposedly Philippine, grasses are described. As was the case with Cavanilles and Lagasca, many of the species credited to the Philippines by Presl were really not from this Archipelago but from tropical America. Haenke, who collected the material on which the above work was based, was also a member of the Malaspina expedition. Many of the species proposed by Presl have been figured and discussed by Scribner,[1] who examined the types in the Bernhardi Herbarium at the Missouri Botanical Garden. Blanco, in his "Flora de Filipinas" (ed. 1, 1837; ed. 2, 1845), considers but 36 species and varieties of *Gramineæ*, and although his descriptions are vague and imperfect, I believe that, with the exception of a few species of *Bambusa*, they are correctly reduced in the following enumeration. In 1851 Llanos described 29 species of grasses in his "Fragmentos de Algunas Plantas de Filipinas," and these are much more obscure than those described by Blanco, and in my treatment of them I have, where consistent, followed F.-Villar, although in some cases F.-Villar reduced Llanos's species to plants which certainly do not extend to the Philippines, thus showing that he had a misconception of them or of those to which they were reduced, or of both. The descriptions of the Philippine species of grasses proposed before 1833 are included by Kunth in his "Enumeratio Plantarum," while those described previously to 1855 are considered by Steudel in his "Synopsis Plantarum Glumacearum," and by Miquel, including those described for the first time by Steudel, in his "Florae Indiae Batavae" (vol. 3, 1859). In 1883 F.-Villar published his "Novissima Appendix" to the third edition of Blanco's "Flora de Filipinas," enumerating 254 species and 28 varieties of grasses, distributed into 72 genera. As this work is a compilation, it frequently happens that the same species is enumerated twice, or in some cases three or even four times under different names in the same or in different genera. Assuming that in most cases F.-Villar's identifications were correct, I have reduced many of his species in accordance with standard works, excluding those which he credited to the Philippines and which have never been collected in the Archipelago, and which are not to be expected in these Islands. His list was compiled from such works as Kunth's "Enumeratio Plantarum," Steudel's "Synopsis," and Miquel's "Florae Indiae Batavae," including such plants as were credited to the Philippines in those works and such others as F.-Villar thought should grow in the Philippines. Many of the admitted species are followed by the letters "v. v. sp.," meaning that he had seen living specimens. It is doubtful if F.-Villar's herbarium contained more than a very small percentage of the species enumerated in the "Novissima Appendix," but as his herbarium, complete or incomplete, has been destroyed,[2] we can not be certain as to just what plants F.-Villar had in mind, and in may cases can only surmise what they might have been. F.-Villar also perpetuated the errors of Cavanilles, Lagasca, and Presl in crediting to the Philippines a number of American species erroneously described by those authors as Philippine, the mistake persisting in the works of Kunth, Steudel, and Miquel, cited above. In 1885, Vidal enumerated 71 species of Philippine *Gramineæ* in his "Phanerogamae Cumingianae Philippinarum," and in 1886, 72 in his "Revision de Plantas Vasculares Filipinas," while about the same number is included by Ceron in his "Catálogo de las plantas del Herbario" (Manila, 1892). In 1904 Mez and Pilger mentioned 107 species and varieties in Perkins's "Fragmenta Florae Philippinae," based for most part on my earlier collections. In 1905 Usteri enumerated 71 species of Philippine grasses in his "Beiträge zur Kenntnis der Philippinen und ihrer Vegetation," based on material collected by himself for the greater part in the Island of Negros. Two papers entitled "Notes on Philippine Gramineæ" have been published by Hackel.[3]

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[1] *Rept. Missouri Bot. Gard.*, 1899, **10**, 35–59, *pls. 1–54*.

So far as genera are concerned I have followed Hackel[4] in arrangement and nomenclature rather closely, but have retained as genera some groups treated by him as subgenera. In accordance with the action of the Vienna Botanical Congress, I have used *Rottboellia* L. f., in place of *Manisuris* Sw.; *Zoisia* Willd., for *Osterdammia* Neck.; *Leersia* Sw., for *Homalocenchrus* Mieg., and *Cynodon* Pers., in place of *Capriola* Adans. Following the spirit of this same Congress, I have retained *Setaria* Beauv., for *Chaetochloa* Scribn., and in retaining *Digitaria* as a genus, I have accepted that name in place of *Syntherisma* Walt.

I have followed Hackel's monograph closely as to generic limits in my treatment of the *Andropogoneæ*, but it might well be argued that if *Digitaria* Scop., of the *Paniceæ* is worthy of generic rank, then, surely, other subgenera of *Panicum* such as *Echinochloa, Ptycophyllum,* and *Hymenachne,* and the more characteristic subgenera of *Andropogon* are also worthy of it. In this connection it is sufficient to state that if, at the present time, there existed a monograph of the *Paniceæ* or of any other tribe of *Gramineæ,* treating such tribe or tribes as Hackel does the *Andropogoneæ*, I should doubtless have followed such work or works in the sequence of genera and species. However, in the matter of a local flora, it is sometimes a decided convenience to consider some sections of large genera as distinct and of generic rank, whereas, because of intermediate forms it might prove impracticable, in a monograph covering the entire world, to regard such groups as distinct.

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[2] Merrill: *Bull. Bureau Agr.*, Manila (1903), **3**, 34.

[3] *Publications of the Bureau of Government Laboratories,* Manila (1905), No. **35**, 79–82. *Phil. Journ. Sci.* **1** (1906) Suppl., 263–269.

[4] Engl. und Prantl: *Nat. Pflanzenfam.* II, **2**, 1–79.

It has been found impossible, because of insufficient material, to treat the *Bambuseæ* at this time with any degree of completeness or satisfaction. In this tribe most of the species flower but rarely and at very long intervals, while in most cases both mature flowers and fruits are essential to work out properly the various species and their relationships. Characters presented by the culm-sheaths are of considerable importance in classification, but many collectors ignore these organs, while notes as to size and habit are apt to be short and incomplete. The scandent bamboos appear to flower at much shorter intervals than do the erect ones, apparently in some cases (*Schizophyllum acutiflorum* Munro) annually. During four and one-half years' experience in the Philippines I have seen but three species of arborescent bamboos in flower, and in two of these the flowering was apparently due to culm-injuries, and was not normal. At most, at the present time there are in our herbarium, in flower, but five species of erect bamboos, but the number of different species actually growing in the Philippines is rather large, and doubtless will approximate 15 or 20.

Economically the *Gramineæ* is the most important family of plants, and this fact applies to the Philippines as well as to other parts of the world. Rice (*Oryza sativa* Linn.) is our most important cereal, and it is grown, with many cultural forms and varieties, throughout the Philippines. Corn (*Zea mays* Linn.), introduced from America at an early date by the Spaniards, is at present the only other cereal of importance grown in the Archipelago. Of minor importance is the culture of Italian millet (*Setaria italica* Beauv.) locally known as *Dawa* or *Dava,* occasionally the true millet (*Panicum miliaceum* Linn.), locally known as *Cabug,* and sorghum (*Andropogon sorghum* Brot.) locally known as *Batad.* In the past, according to early reports, wheat (*Triticum vulgare* Vill.) was somewhat planted in northern Luzon, but its culture in the Archipelago has now been discontinued. Of great commercial importance to the Philippines, is the culture of sugar cane (*Saccharum officinarum* Linn.).

Practically the only forage grass which is planted in the Philippines is *Leersia hexandra* Sw., locally known as *Zacate* or *Barit*. Large areas in the vicinity of Manila are adapted to the cultivation of this grass, which is used entirely as green forage. Land for the culture of this crop is prepared in the form of rice paddies, standing water being essential. I have found no record of the culture of this grass for forage in other parts of the world, although it is distributed throughout the Tropics, its culture apparently having been developed in Manila to meet local conditions. Bermuda grass (*Cynodon dactylon* Pers.), locally known as *Grama*, is utilized somewhat for green forage, and also some strictly wild grasses such as *Panicum stagninum* Retz., locally known as *Balili*. Rice straw and corn are to a certain extent employed for forage, and teosinte (*Euchlaena luxurians* Schrad.), a recent importation, appears to have considerable value for this purpose. Grasses useful for grazing comprise many different species, especially of the *Andropogoneæ* and *Paniceæ*. The most important lawn grass, and the one best adapted to local conditions, is *Cynodon dactylon*, but sometimes in Manila *Zoisia pungens* is utilized.

Imperata cylindrica var. *koenigii* Benth., and *I. exaltata* Brongn., locally known as *Cogón*, are extensively used for thatching roofs, and these two species, together with *Saccharum spontaneum* Linn., locally known as *Taláhib*, because of their gregarious habit of growth and the great areas occupied by them, may prove to be of considerable value as a material for paper manufacture.[5] In the highlands of northern Luzon, the stout stems of *Miscanthus sinensis* Anders., are employed by the natives for making walls, and even the floors or houses, and in the absence of *Imperata*, the leaves are used for thatch. The roots of *Andropogon squarrosus* Linn. f., locally known as *Mora* or *Raiz Mora*, are commonly sold in Manila, and because of their pleasant perfume are utilized for various purposes. *Andropogon schoenanthus* Linn., from which lemon-grass oil is obtained, is rarely cultivated. The flexible panicles of *Phragmites vulgaris* Lam., locally known as *Tambó* are made into dust brooms and extensively sold in Manila and in other towns in the Archipelago. The hard fruits of *Coix lachryma-jobi* Linn., are used for beads and necklaces, and the mature seeds of the variety *ma-yuen* are locally used as food. The roots of a few species of grasses are used by the natives in the practice of medicine.

The uses of bamboo are almost too numerous to mention, the chief among these in the Philippines being in the construction of houses, bamboo providing posts, floors, walls, and even roofs; in the building of fences, temporary bridges, and scaffolds; for water pipes, rafts, floats to transport heavy timbers down streams, and for the manufacture of furniture; for masts and outriggers on boats; for baskets, water buckets, cups, and even temporary cooking utensils; for fish traps, corrals, and wiers; for carrying poles, walking sticks, musical instruments, pipes, and pipestems; fire-making apparatus, blowguns, arrows, and spear handles; for rope, coarse and fine hats etc. The young shoots of some species are used for food. Good drinking water is frequently found in the hollow internodes, especially in the climbing species (*Dinochloa* and *Schizophyllum*), and various parts of some species are used by the natives in the practice of medicine. It is very probable that eventually the more abundant species will be found to have considerable value as a material for making paper.

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[5] Richmond: *Phil. Journn. Sci.* (1906), 1, 457–460.

About 17 of the 225 species and varieties enumerated in the present paper have been introduced into the Islands either because of their economic value or accidentally as weeds. The most important of these introduced species are the cultivated ones, *Euchlaena luxurians* Schrad., *Zea mays* Linn., *Saccharum officinarum* Linn., *Andropogon sorghum* Brot., *Setaria italica* Beauv., *Oryza sativa* Linn., and *Triticum vulgare* Vill. *Bambusa blumeana* Schultes, the most common building bamboo in the Philippines, is apparently cultivated only, and not a native species. *Cenchrus echinatus* Linn., *Paspalum conjugatum* Berg., and *Chloris barbata* Sw., have been introduced as weeds, probably all from tropical America.

About 46 species and varieties are endemic, including one monotypic genus, *Garnotiella philippinensis* Stapf. Thirty-two species are cosmopolitan in the Tropics of the world, a few of them extending into the temperate regions. Twenty-nine represent northern or Asiatic types, the most characteristic of which are *Pollinia quadrinervis* Hack., *P. imberbis* var. *willdenowiana* forma *monostachya* Hack., *P. nuda* Hack., *Ophiurus monostachyus* Presl, *Saccharum arundinaceum* Retz., *Ischaemum angustifolium* Hack., *Eremochloa ciliaris* Merr., *Arthraxon microphyllus* Hochst., *A. ciliaris*, varieties, *Arundinella setosa* Trin., *A. agrostoides* Trin., *Digitaria pedicellaris* Merr., *Isachne debilis* Rendle, *Panicum villosum* Lam., *Anthoxanthum luzoniense* Merr., *Aristida cumingiana* Trin. & Rupr., *Agrostis elmeri* Merr., *Calamagrostis arundinacea nipponica* Hack., *C. filifolia* Merr., *Eriachne triseta* Nees, *Coelachne hackelii* Merr., *Eragrostis japonica* Trin., *Poa luzoniensis* Merr., *Bromus pauciflorus* Hack., and *Brachypodium silvaticum* Beauv.; of these, *Anthoxanthum, Agrostis, Calamagrostis, Poa, Bromus,* and *Brachypodium* are distinctly boreal.

About 12 represent Australian types, of which the following are known only from Australia and the Philippines: *Pollinia irritans* Hack., *Andropogon fragilis* Hack., *A. baileyi* F. Muell., *Microlaena stipoides* R. Br., and *Andropogon filipendulus* var. *lachnatherus* Hack., *Andropogon sericeus* and *Rottboellia ophiuroides* Benth. are known only from Australia, New Guinea, and the Philippines. *Perotis rara* R. Br., *Panicum caudiglume* Hack., *P. mindanaense* Merr., *Ischaemum arundinaceum* var.

radicans Hack., and *Aristida stipoides* R. Br., var. *tenuisetulosa* Pilger are also identical with Australian species or have affinities with Australian types.

Characteristic Malayan species are *Coelorhachis biaurita* Hack., *Isachne beneckei* Hack., *Panicum auritum* Presl, *Oplismenus undulatifolius* var. *imbecillis* Hack., *Pennisetum macrostachyum* Trin., *Leptaspis urceolata* R. Br., and *Dinochloa scandens* O. Kuntze, these species being for most part confined to the Malayan region, while no less than 100 other species are common to the Philippines and Malaya, but also extend to other regions.

Pollinis tenuis Trin., and *Ischaemum intermedium* are known only from the Philippines and Polynesia, but many other characteristic species extend from other places through the Philippines to that region.

Twenty-six species extend from Africa to southern Asia and Malaya and the Philippines, 8 of which reach Polynesia and 10 Australia. Forty species are encountered from southern Asia and Malaya, 6 of them being found also in Polynesia and 19 in Australia.

On the whole, the Philippine *Gramineæ* are strongly Malayan or Indo-Malayan, with a decided northern element in the highlands of northern Luzon, and a rather characteristic Australian one, which, strangely, is from the same northern region of the Archipelago, rather than from the southern islands, although when more extensive collections have been made in the interior of Mindanao, doubtless most of these Australian types, which at present are known in the Philippines only from northern Luzon, will be found in Mindanao.

I acknowledge, with great pleasure, the valuable assistance of Dr. E. Hackel, of Graz, Austria, in the preparation of this paper, as he has verified very many of my own identifications, corrected others, compared my material with type or authentic specimens, identified many species, and supplied me with copious notes on synonomy. Without this assistance it would have been impossible for me to have issued this paper in its present form, nor would the finished work have been nearly as authentic.

GRAMINEÆ.

CHARACTERS OF THE ORDER.

Erect, decumbent or creeping herbs, annual or perennial, or in the tribe *Bambuseæ* erect or scandent shrubs or trees. Culms (stems) terete or compressed, jointed; internodes usually hollow, sometimes solid. Leaves simple, usually long and narrow, entire, parallel-veined, the sheathing portion below distinct from the blade and split down one side, bearing at the juncture of the blade with the sheath a membranous or cartilaginous appendage (ligule), the ligule rarely wanting, sometimes reduced to a row of hairs. Inflorescence spicate, recemose, capitate or paniculate, consisting of spikelets composed of two to many 2-ranked imbricated bracts (glumes), the two lowest normally empty, one or both of these sometimes wanting or very much reduced. One or more of the upper glumes except sometimes the terminal ones contains in the axil a flower which is usually inclosed by the bract like palea. Flowers perfect or staminate, sometimes dioecious or monoecious, subtended by 1 to 3 minute hyaline scales (lodicules). Stamens 1 to 6, usually 3; anthers 2-celled, versatile. Ovary 1-celled, 1-ovuled; styles 1 to 3, commonly 2; stigmas hairy or plumose. Fruit a seed-like grain (caryopsis).

Genera about 335; species about 3,500, widely distributed in all parts of the world, the greater number of species being found in the Tropics but the greater number of individuals being found in temperate regions.

KEY TO THE TRIBES AND GENERA.

1. Spikelets one, rarely two-flowered, lower flower when present imperfect, falling from the pedicel entire or with certain joints of the rhachis at maturity. Rhachilla not produced beyond the flowers.

2. Spikelets cylindrical or somewhat dorsally compressed; empty glumes manifest; hilum punctiform.

3. Flowering glumes and palea hyaline, much more delicate in structure than the thick-membranous to cartilaginous empty glumes.

4. Spikelets unisexual on separate inflorescences or on different parts of the same inflorescence .... I. MAYDEÆ

4. Spikelets in pairs, one sessile, one pedicellate in the same inflorescence, the former perfect, the latter staminate or empty, rarely perfect .... II. ANDROPOGONEÆ

3. Flowering glumes, at least of the perfect flower, similar in texture to the empty glumes or frequently thicker, never hyaline and thin.

4. Flowering glume and palea membranous.

5. Inflorescence spicate; spikelets falling singly or in groups, the first glume usually larger than the rest.. III. ZOISIEÆ

5. Inflorescence paniculate; spikelets deciduous singly from the ultimate branchlets of the inflorescence, the first glume usually smaller or narrower than the rest.......... IV. TRISTEGINEÆ

4. Flowering glume and palea chartaceous, cartilaginous, or coriaceous, very different in color and appearance from the empty glumes .... V. PANICEÆ

2. Spikelets much compressed laterally; empty glumes none or rudimentary; hilum linear .... VI. ORYZEÆ

1. Spikelets one to many flowered, the empty glumes persistent, the rachilla generally articulated above the empty glumes and produced beyond the upper glume, the upper glumes frequently empty.

2. Stems herbaceous; leaf-blades sessile, not articulated with the sheath.

3. Spikelets pedicellate in panicles, spike-like panicles or racemes.

4. Spikelets one-flowered.

5. Empty glumes four; palea one-nerved .... VII. PHALARIDEÆ

5. Empty glumes two; palea two-nerved.. VIII. AGROSTIDEÆ

4. Spikelets two to many flowered.

5. Flowering glumes usually shorter than the empty ones, usually with a bent awn on the back, rarely awned from the apex........................ IX. AVENEÆ

5. Flowering glumes generally longer than the empty ones, unawned, or with a straight awn from the apex.. XI. FESTUCEÆ

3. Spikelets in two rows.

4. Spikelets crowded on one side of the continuous rhachis, forming one-sided spikes or racemes .... X. CHLORIDEÆ

4. Spikelets in two opposite rows of the often articulate rhachis, forming equilateral spikes .... XII. HORDEÆ

2. Stems woody; leaf-blade with a petiole-like base which is articulated with the sheath .... XIII. BAMBUSEÆ

Tribe I. MAYDEÆ.

1. Staminate spikes numerous in terminal panicles; pistillate spikes in the axils of the leaves subtended by large membranous bracts at the base.

2. Pistillate spikes of each leaf-axil free, articulated.... (1) *Euchlaena*

2. Pistillate spikes of each leaf-axil grown together into a continuous, compound, and much thickened axis .... (2) *Zea*

1. Staminate spikes solitary at the ends of the branchlets; pistillate below, one to two, each of them reduced to a single spikelet entirely inclosed by the ovoid or spherical, ivory-like sheath of the subtending bract................ (4) *Coix*

1. Staminate and pistillate spikelets in the same spike, the lowest glume of the pistillate spikelets indurated.... (3) *Chionachne*

Tribe II. ANDROPOGONEÆ.

1. Spikelets homogamous, hermaphrodite; joints of the rhachis not much thickened nor excavated for the reception of the spikelet.

2. Axis of the racemes continuous.

3. Spikelets solitary, disposed in several slender unilateral racemes .... (5) *Dimeria*

3. Spikelets in pairs, rarely in threes, upon each joint of the rhachis, paniculate.

4. Racemes in a narrow, usually spike-like panicle; spikelets awnless........ (6) *Imperata*

4. Racemes in a board panicle; spikelets usually awned .... (7) *Miscanthus*

2. Axis of the racemes articulate.

3. Racemes solitary, terminal.

4. Spikelets in pairs at each joint of the rhachis .... (11) *Pogonatherum*

4. Spikelets in threes at each joint of the rhachis .... (10) *Polytrias*

3. Racemes two to many, digitate or approximate on a shortened main axis.

4. Spikelets one, rarely two-flowered; when two flowered the first empty glume with a median longitudinal furrow .... (9) *Pollinia*

4. Spikelets two-flowered, the first empty glume without a longitudinal furrow.. (15) *Ischaemum*

3. Racemes in a much-branched panicle upon an elongated main axis, the lateral racemes sessile .... (8) *Saccharum*

1. Spikelets heterogamous or rarely homogamous, the joints of the axis of the raceme (false spike) appressed or grown to the pedicels of the primary spikelets, forming a hollow or excavation for the reception of the secondary spikelets; fertile glumes always awnless.
  2. Spikelets 2-nate; first empty glume flat.......... (12) *Rottboellia*
  2. Spikelets 2-nate; first empty glume globose.......... (13) *Manisuris*
  2. Spikelets solitary; first empty glume convex.......... (14) *Ophiurus*
1. Spikelets heterogamous, the sessile hermaphrodite, rarely pistillate, the pedicellate staminate, empty or wanting, very rarely all hermaphrodite or all pedicellate; joints of the racemes not strongly thickened, nor with excavations for the reception of the spikelets.
  2. Sessile spikelets 2-flowered.
    3. Racemes reduced to the terminal joint with three spikelets, and enclosed by a sheathing leaf or bract.......... (17) *Apluda*
    3. Racemes with many joints.
      4. Spikes rarely solitary; spikelets 2-flowered, awned .... (15) *Ischaemum*
      4. Spikes solitary; spikelets 1-flowered, the first glume pectinate.......... (16) *Eremochloa*
  2. Sessile spikelets 1-flowered.
    3. A false whorl of four or more staminate or empty spikelets at the base of each raceme; racemes usually subtended by a sheathing leaf .... (20) *Themeda*
    3. No distinct whorl of staminate or empty spikelets at the base of the racemes, or where an imperfect one occurs, the racemes in pairs, subtended by a leaf-sheath.
      4. Fertile glume awned from the back or base; leaves cordate at the base.. (18) *Arthraxon*
      4. Fertile glumes awned from the apex or from a more or less deep cleft, or awnless; leaves not cordate at the base .... (19) *Andropogon*

Tribe III. **ZOISIEÆ.**

1. Spike slender; spikelets narrow; first and second glumes awned .... (21) *Perotis*
1. Spike rigid; spikelets appressed to the rhachis, not awned.. (22) *Zoisia*

Tribe IV. **TRISTEGINEÆ.**

1. Flowering glumes of the hermaphrodite flowers awned; awns usually geniculate and twisted below; slender grasses .... (23) *Arundinella*
1. Flowering glumes awnless; spikelets minute; very coarse grasses .... (24) *Thysanolaena*

Tribe V. **PANICEÆ.**

1. Spikelets all perfect.
  2. Spikelets without any special covering or involucre consisting of spines or bristles.
    3. Empty glumes two; perfect flower one in each spikelet.
      4. Lower empty glume with a thickened ring-like callus .... (27) *Eriochloa*
      4. Lower empty glume without a ring-like and thickened callus; spikelets in one-sided racemes or spikes.
        5. Spikelets ovate or orbicular, obtuse, rarely acute .... (25) *Paspalum*
        5. Spikelets lanceolate, acute or acuminate .... (26) *Digitaria*

3. Empty glumes two; perfect flowers two in each spikelet .... (28) *Isachne*

3. Empty glumes three; perfect flower one in each spikelet.

4. Glumes unawned; spikelets panicled or spicate .... (29) *Panicum*

4. Glumes unawned; spikelets of *Panicum*, but the flowering glume narrowed into a short stipe or with two appendages or pits at the base........ (30) *Ichnanthus*

4. Empty glumes or flowering glumes awned or awn-pointed.

5. Flowering glumes unawned; empty glumes awned or awn-pointed.

6. Prostrate or ascending grasses; racemes or clusters of few spikelets; empty glumes glabrous or pubescent.. (31) *Oplismenus*

6. Erect grasses; racemes of many spikelets; empty glumes often muricate-hispid .... (29) *Panicum* § *Echinochloa*

5. Flowering glume awned; nerves of the second empty glume broadly fimbriate; palea of the third glume deeply cleft.. (33) *Axonopus*

2. Spikelets subtended by an involucre, consisting of from one to many bristles or spines which are sometimes grown together.

3. Involucre of two spine-bearing valves........ (34) *Cenchrus*

3. Involucre of numerous bristles.

4. Spikelets fasciculate; involucral bristles falling with the spikelet........ (35) *Pennisetum*

4. Spikelets usually solitary; involucral bristles persistent after the fall of the spikelet .... (32) *Setaria*

3. Involucre of solitary bristles.

4. Inflorescence in open panicles; prostrate aquatic grasses .... (35) *Chamaeraphis*

4. Inflorescence in dense cylindrical spikes or spike-like panicles; erect grasses .... (32) *Setaria*

1. Spikelets monoecious or dioecious.

2. Monoecious; slender prostrate grasses; inflorescence a terminal spike, the two lower spikelets perfect, the four to six upper ones staminate.. (37) *Thuarea*

2. Dioecious; very coarse prostrate grasses; pistillate flowers collected into large globose heads with very long spines; staminate flowers in umbellately disposed racemes .... (38) *Spinifex*

Tribe VI. **ORYZEÆ.**

1. Spikelets unisexual; fruiting glumes inflated; leaves broad.. (39) *Leptaspis*

1. Spikelets perfect; fruiting glumes not inflated.

2. Empty glumes two, short but distinct; spikelets awned or awnless........ (40) *Oryza*

2. Empty glumes wanting; spikelets awnless........ (41) *Leersia*

Tribe VII. **PHALARIDEÆ.**

1. First and second glumes minute, the third and fourth longer than the flowering glume........ (42) *Microlaena*

1. First and second empty glumes equaling or exceeding the third and fourth .... (43) *Anthoxanthum*

Tribe VIII. **AGROSTIDEÆ.**

1. Flowering glume awnless.

2. Panicles strict; pericarp free; grain not permanently enclosed in the flowering glume and palea.. (45) *Sporobolus*

2. Panicles very lax; pericarp adherent; grain enclosed in the flowering glume and palea........................... (48) *Agrostis*

1. Flowering glume awned.

2. Flowering glume indurated, much firmer in texture than the empty glumes, 3-awned........................... (44) *Aristida*

2. Flowering glume usually hyaline and more delicate than the empty glumes, 1-awned.

3. Flowering glume awned from the apex or from the cleft; spikelets articulate on their pedicels.

4. Spikelets geminate, lanceolate or linear-lanceolate; first and second glumes 3-nerved; flowering glume faintly 1 to 3 nerved, awned from the apex .... (46) *Garnotia*

4. Spikelets solitary; first and second glumes nerveless; flowering glume lobed at the apex and bearing a long awn in the cleft........................ (47) *Garnotiella*

3. Flowering glume awned from the back near the base; spikelets inarticulate; rhachilla produced and penicellate............................ (49) *Calamagrostis*

Tribe IX. **AVENEÆ.**

1. Spikelets small, 2-flowered; rhachilla not produced.

2. Flowering glumes long ciliate-fringed on the back or margins; emtpy glumes broad, many nerved; spikelets awned .... (50) *Eriachne*

2. Flowering glumes naked; spikelets unawned........... (51) *Coelachne*

1. Spikelets large, 2 or more flowered, rhachilla produced beyond the upper flower.. (52) *Avena*

Tribe X. **CHLORIDEÆ.**

1. Spikes or spiciform branches digitate or approximate.

2. Spikelets 1-flowered, the upper imperfect flower wanting .... (53) *Cynodon*

2. Spikelets two or more flowered, the upper flower imperfect, the flowering glume awned.................... (54) *Chloris*

2. Spikelets with three to six perfect flowers.

3. Spikes with terminal spikelets........................ (55) *Eleusine*

3. Spikes with the rhachis extending beyond the spikelets in a manifest point...................... (56) *Dactyloctenium*

1. Spikes or spiciform branches panicled, filiform; spikelets minute, alternate .... (57) *Leptochloa*

Tribe XI. **FESTUCEÆ.**

1. Spikelets in spiciform branches of a simple panicle.

2. Flowering glumes 1 to 3-nerved; spikelets many flowered .... (60) *Diplachne*

2. Flowering glumes 7 to 9-nerved; spikelets 1 to several flowered.

3. Spikelets 1-flowered; upper glumes convolute, with setiform tips............................ (63) *Lophatherum*

3. Spikelets more than 1-flowered; fruiting glumes with reflexed submarginal bristles.. (62) *Centotheca*

1. Spikelets in open compound panicles, the branches not spiciform.
   2. Coarse erect grasses; flowering glume or rhachilla long-penicellate.
      3. Rhachilla short-hairy; flowering glumes penicellate .... (59) *Neyraudia*
      3. Rhachilla penicellate; flowering glumes glabrous .... (58) *Phragmites*
   2. Usually slender grasses; rhachilla and flowering glumes glabrous or hairy; if hairy, the hairs much shorter than the glumes.
      3. Flowering glumes glabrous, 3-nerved.......... (61) *Eragrostis*
      3. Flowering glumes glabrous or pubescent on the nerves, 5 to many nerved.
         4. Flowering glumes 5-nerved, pilose on the nerves, not awned .... (64) *Poa*
         4. Flowering glumes mucronate or awned, rounded dorsally, 5-nerved; top of the ovary villous; inflorescence paniculate .... (65) *Bromus*
         4. Flowering glumes many, awned or mucronate, 7 to 9 nerved; inflorescence spicate .... (66) *Brachypodium*

Tribe XII. **HORDEÆ.**

1. Glumes with their backs turned to the hollow surface of the rhachis; maratime grasses .... (67) *Monerma*
1. Glumes with their sides turned to the hollowed surface of the rhachis; cultivated grasses .... (68) *Triticum*

Tribe XIII. **BAMBUSEÆ.**

1. Fruit a true caryopsis with a delicate pericarp.
   2. Filaments free; palea of the upper flower 2-keeled.. (69) *Bambusa*
   2. Filaments united into a tube; all the paleas 2-keeled .... (70) *Gigantochloa*
1. Fruit a nut with a thick free pericarp.
   2. Spikelets very small, ovate .... (72) *Dinochloa*
   2. Spikelets elongated, linear or linear-lanceolate........ (71) *Schizostachyum*

Tribe I. **MAYDEÆ.**

The staminate spikelets occupying the upper portion of the inflorescence or of its divisions, the pistillate below. Grain ellipsoid or roundish, unfurrowed. Culms tall, with pith.

(1) **EUCHLAENA** Schrad.

Staminate spikelets in a terminal panicle, two at each joint of the rhachis, one sessile, one pedicellate; glumes membranous. Pistillate spikelets in 2-ranked spikes, the spikes fasciculate in the leaf-axils, the axis jointed. Tall annuals with very broad leaves.

Species 1 or 2, Mexican, 1 introduced into the Philippines. *Teosinte.*

(1) **Euchlaena luxurians** Schrad. Ind. Sem. Hort. Gott. (1832) ex Linnaea **8**, Litterbl. 25; Fournier in Bull. Soc. Bot. Belg. **15**: 467; Gram. Mex. 69; Curtiss' Bot. Mag. *t. 6414*.

LUZON, Province of Bataan, Lamao (*Whitford*), April, 1904.

Cultivated only; introduced from America in the year 1903; a native of Mexico.

(2) **ZEA** Linn.

Habit, foliage, staminate florescence and arrangement of the pistillate spikes as in the preceeding genus, but the pistillate spikes grown together into a spongy, continuous body, the seeds being borne in 4 to 11 double rows.

Species 1, with many cultural varieties and forms; a native of tropical America and now cultivated in most tropical and temperate countries. *Corn* or *Indian Corn.*

(1) **Zea mays** Linn. Sp. Pl. (1753) 871; Blanco Fl. Filip. ed. 1 (1837) 686; ed. 2 (1845) 476; ed. 3, **3** (1879) 90; Miq. Fl. Ind. Bat. **3** (1859) 477; F.-Vill. Nov. App. (1883) 314; Merr. in Govt. Lab. Publ. **6** (1904) 28; Usteri Beitr. Kenn. Philip. Veg. (1905) 133.

Extensively cultivated throughout the Philippines, one of the first American plants introduced into the Philippines by the Spaniards, several forms and varieties being cultivated in the Archipelago. Sp.-Fil., *Maiz.*

(3) **CHIONACHNE** R. Br.

Culm much branched, branches terminated by spikes that are subtended by a sheathing leaf. Spikes with 1 to 5 pistillate spikelets and many staminate spikelets. Similar to *Coix*, but the fruit capsule is formed by the empty glume.

Species 4, British India to the Malayan Archipelago and Australia, 1 endemic species in the Philippines.

(1) **Chionachne biaurita** Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 263.

LUZON, Province of Benguet, Bued River (4282 *Merrill*), October, 1905. On fresh talus slopes at about 1,000 m.

Endemic.

(*Chionachne barbata* R. Br.=*Polytoca barbata* Stapf, a British Indian and Javan grass, is reported from the Philippines by F.-Villar, Nov. App. (1883), 314, but the record has never been verified.)

(4) **COIX** Linn.

Culm branched, branches ending in one or two short, ivory-like nearly globose, very hard capsules with an opening at the top, and surrounding the pistillate spikelets, the staminate inflorescence projecting out of the orifices of the capsules.

Species 3 or 4, southern Asia and Malaya, 1 in the Philippines. *Tear Grass* or *Job's Tears.*

(1) **Coix lachryma-jobi** Linn. Sp. Pl. (1753) 972; Hook. f. Fl. Brit. Ind. **7** (1897) 100; Pilger in Perk. Frag. Fl. Philip. (1904) 137; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 345; Usteri Beitr. Kenn. Philip. Veg. (1905) 132, err. typ. "*lachrymae-iovis.*" *Coix lachryma* Linn. Syst. ed. 10, 1261; Blanco Fl. Filip. ed. 1 (1837) 688; ed. 2 (1845) 478; ed. 3, **3** (1879) 92; Miq. Fl. Ind. Bat. **3** (1859) 476; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 288; F.-Vill. Nov. App. (1883) 314. *Coix agrestis* Lour.; F.-Vill. l. c.

PHILIPPINES (448 *Cuming*) 1836–40. LUZON, Manila (64 *Merrill*), May, 1902: Province of Benguet, Baguio (5761 *Elmer*) March, 1904; (39, 136 *Topping*)

January, 1903: Province of Rizal, Bosoboso (1853 *Merrill*) April, 1903: Province of Batangas, Lipa (112 *Marave*) December, 1895: Province of Tayabas, (Infanta) Binangonan (832 *Whitford*) September, 1904. MINDORO, Baco River (263 *McGregor*) April, 1905. PALAWAN, Tanabag (323 *Bermejos*) January, 1906. BALABAC (437 *Mangubat*) March, 1906. MINDANAO, Davao (653 *Copeland*) March, 1904: Lake Lanao, Camp Keithley (52 *Clemens*) January, 1906.

Widely distributed in the Philippines; warmer parts of the world. T., *Tigbi*, *Cudlasan*; V., *Adlay*; B., *Cueldasan*; Ig., *Agda*.

Var. **ma-yuen** (Roman.) Stapf. in Hook. f. Fl. Brit. Ind. **7** (1897) 100. *Coix ma-yuen* Roman. in Bull. Soc. Acclim. Paris III. **8** (1881) 442.

LUZON, Province of Rizal, Montalban (3394 *Ahern's collector*) November, 1905. JOLO, Mount Dajo (5326 *Merrill*) October, 1906.

British India to Cochin China and Borneo. T., *Ylas*.

Tribe II. **ANDROPOGONEÆ.**

Spikelets in spike-like racemes, two, rarely only one, at each joint of the usually articulate rhachis, one sessile and one pedicellate. Spikelets generally 1-flowered, with three empty glumes, the first empty glume always more indurated than the flowering glume, the latter usually hyaline and bearing a bent or twisted awn.

(5) **DIMERIA** R. Br.

Spikelets 1-flowered, linear, laterally compressed; first empty glume keeled. Flowering glumes awned. Spikes digitate. Very slender grasses.

Species 12, British India to South China, Malaya and north Australia; one in the Philippines.

(1) **Dimeria orinthopoda** Trin. Fund. Agrost. (1820) 167. *t. 14*, var. **tenera** (Trin.) Hack. in DC. Monog. Phan. **6** (1889) 81. *Dimeria tenera* Trin. in Mém. Acad. St-Pétersb. VI. **2** (1833) 335. F.-Vill. Nov. App. (1883) 315. *D. orinthopoda* Merr. Philip. Journ. Sci. **1** (1906) Suppl. 25.

LUZON, Province of Bataan, Lamao River (3283, 3773 *Merrill*) October, 1903, January, 1904: Province of Rizal, Caloocan (3676 *Merrill*) November, 1903; Antipolo (15 *Foxworthy*) January, 1906.

British India to Japan, Malaya, other varieties extending to tropical Australia.

(F.-Villar enumerates *Haplachne pilosissima* Presl, and *Andropogon chloridiformis* Gaudich., as distinct species, but without really crediting them to the Philippines. Both are synonyms of *Dimeria pilosissima* Trin., a Marianne Island species.)

(6) **IMPERATA** Cyr.

Spikelets 1-flowered, densely clothed with long silky hairs. Empty glumes membranous, narrow, the two outer with long hairs. Flowering glume small. Stamens 1 to 2. Panicles narrow, usually spike-like.

Species 5, tropical and subtropical regions of the World; two in the Philippines.

1. Panicle narrow, spiciform, the branches short, appressed; first glume 5 to 9 nerved; stamens 2 .... (1) *I. cylindrica*
1. Panicle thyrsiform, branches usually elongated, sometimes spreading; first glume 3 to 5 nerved; stamens 1 .... (2) *I. exaltata*

(1) **Imperata cylindrica** (Linn.) Beauv. Agrost. (1812) Expl. Planch. 5. *t. 5. f. 1.* var. **koenigii** (Retz.) Benth.; Pilger in Perk. Frag. Fl. Philip. (1904) 137. *Imperata arundinacea* Cyr.; Miq. Fl. Ind. Bat. **3** (1859) 514; F.-Vill. Nov. App. (1883) 316. *I. arundinacea* var. *koenigii* Hack. in DC. Monog. Phan. **6** (1889) 84; Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 289. *Saccharum spicatum* Presl Rel. Haenk **1** (1830) 346; Scribn. Rept. Mo. Bot. Gard. **10** (1899) 52. *pl. 1;* Miq. Fl. Ind. Bat. **3** (1859) 513; Kunth, Enum. **1** (1833) 476; F.-Vil. Nov. App. (1883) 317.

LUZON, Province of Benguet, Baguio (5753 *Elmer*) March, 1904: Manila (85 *Merrill*) May, 1902: Province of Pampanga, Bacolor (32 *Parker*) May, 1904. MINDORO, Baco River (123 *McGregor*) April, 1905. SIBUYAN (27 *McGregor*) July, 1904. BOHOL (1218 *McGregor*) June, 1906. MINDANAO, Davao (184 *DeVore & Hoover*) April, 1903; (537 *Copeland*) March, 1904: Lake Lanao, Camp Keithley (145 *Clemens*) February, 1906.

Abundant and widely distributed in the Philippines, the species being distributed through the warmer parts of the World, the variety *koenigii*, extending from tropical Africa to southern Asia, Japan, Malaya, Australia, New Caledonia, and the Fiji Islands. T., *Cogón.*

(2) **Imperata exaltata** Brongn. Voy. Coqu. Bot. (1829) 101, excl. syn.; Hack. in DC. Monog. Phan. **6** (1889) 98; Pilger in Perk. Frag. Fl. Philip. (1904) 137; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 26. *Imperata ramosa* Anders.; Rolfe, in Journ. Bot. **23** (1885) 216; Vidal, Phan. Cuming. Philip. (1885) 158; Vidal, Rev. Pl. Vasc. Filip. (1886) 289. *Saccharum negrosense* Steud. Syn. **1** (1855) 407. *Saccharum confertum* Presl Rel. Haenk. **1** (1830) 364; Kunth, Enum. **1** (1833) 476; F.-Vill. Nov. App. (1883) 317. *Saccharum alopecuros* Nees; Miq. Fl. Ind. Bat. **3** (1859) 513; F.-Vill. Nov. App. (1883) 317.

PHILIPPINES (1801 *Cuming*) 1836–40. LUZON, Province of Rizal, Bosoboso (3279 *Ahern's collector*) August, 1905: Province of Tayabas, Atimonan (122 *Gregory*) August, 1904; (665 *Whitford*) August, 1904. PALAWAN, E-wi-ig River (701 *Merrill*) February, 1903.

Common and widely distributed in the Philippines, Malayan Peninsula and Archipelago to New Hebrides. T., *Cogón.*

Imperata exaltata Brongn. subsp. **merrillii** Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 264.

LUZON, Province of Benguet, Mount Tonglon (4813 *Merrill*) November, 1905. Endemic.

(7) MISCANTHUS Anders.

Distinguished from *Imperata* by its broad panicles, three stamens and the flowering glumes more or less bifid and usually awned between the teeth or lobes. Tall coarse grasses.

Species 7 or 8, southern and eastern Asia to Malaya and Polynesia; two in the Philippines.

1. Racemes not fastigiate, the lower ones semiverticellate shorter than the common rhachis, laxly flowered .... (1) *M. japonicus*
1. Racemes corymbose-fastigiate, the lower ones exceeding the common rhachis, densely flowered .... (2) *M. sinensis*

(1) **Miscanthus japonicus** (Thunb.) Anders. Oefv. Vet. Akad. Forhandl. Stockh. (1855) 166; Hack. in DC. Monog. Phan. **6** (1889) 107; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 347; Koord. Meded.'s Lands Plant. **19** (1898) 274. *Saccharum praegrande* Steud. Syn. **1** (1855) 408. *Miscanthus luzonensis* Anders. l. c. 166; Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 289; Rolfe in Journ. Bot. **23** (1885) 216.

PHILIPPINES (787 *Cuming*) 1836–40. MINDANAO, Lake Lanao, Camp Keithley (*Clemens*) March, 1906. SAMAR, Borongan (5220 *Merrill*) October, 1906.

Japan and China to Malaya.

(2) **Micanthus sinensis** Anders. l. c. 166; Rendle l. c. 348. Hack. l. c. 105. *Eulalia japonica* Trin.; Miq. Fl. Ind. Bat. **3** (1859) 518; F.-Vill. Nov. App. (1883) 316. *Miscanthus japonicus* Pilger in Perk. Frag. Fl. Philip. (1904) 137; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 26, non Anders.

LUZON, District of Lepanto, Mount Data (4492 *Merrill*) November, 1905: Province of Benguet, Pauai (4734 *Merrill*) November, 1905: Baguio to Ambuklao (4353 *Merrill*) October, 1905; Mount Santo Tomas (6271 *Elmer*) May, 1904: Province of Pampanga, Mount Arayat (4214, 3923 *Merrill*) September, 1905, October, 1904: Province of Bataan, Mount Mariveles (3198 *Merrill*) October, 1903; (1341 *Whitford*) September, 1905: Province of Tayabas, Mount Bañajao (946 *Whitford*) October, 1904; Province of Principe, Baler (1125 *Merrill*) September, 1902.

Japan and China to Cochin China, Borneo and Celebes.

(8) **SACCHARUM** Linn.

Panicles usually expanded, the branches many jointed. Spikelets slender, the somewhat hardened first and second empty glumes with long hairs. Tall grasses, the small spikelets surrounded by long silky hairs.

Species about 12, mostly in the tropics of the Old World, three in America; three species in the Philippines, one cultivated only.

1. Stem silky below the panicle .... (2) *S. spontaneum*
1. Stem glabrous below the panicle.
    2. Joints of the racemes and pedicels glabrous; cultivated only .... (1) *S. officinarum*
    2. Joints of the racemes and pedicels long-pilose; spontaneous .... (3) *S. arundinaceum*

(1) **Saccharum officinarum** Linn. Sp. Pl. ed. 1, (1753) 54. Blanco, Fl. Filip. ed. 1, (1837) 42; ed. 2, (1845) 29; ed. 3, **3** (1877) 55; Miq. Fl. Ind. Bat. **3** (1859) 507; Hack. in DC. Monog. Phan. **6** (1889) 111; Hook. f. Fl. Brit. Ind. **7** (1897) 118; F.-Vill. Nov. App. (1883) 317. *S. violaceum* F.-Vill. l. c. 317, non Tussac.

Extensively cultivated throughout the Philippines, native country unknown. Sugar Cane. T., *Tuba;* V., *Quilala;* Cag., *Agbo;* Sp.-Fil., *Caña dulce.*

(2) **Saccharum spontaneum** Linn. Mant. **2** (1771) 183, subsp. **indicum** Hack. in DC. Monog. Phan. **6** (1889) 113; Pilger in Perk. Frag. Fl. Philip. (1904) 137. *S. spontaneum* Linn.; Miq. Fl. Ind. Bat. **3** (1859) 512; Rolfe in Journ. Bot. **23** (1885) 216; Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 289; Ceron Cat. Pl. Herb. (1892) 182; Usteri Beitr. Kenn. Philip. Veg. (1905) 133; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 26. *Saccharum koenigii* Blanco, Fl. Filip. ed. 1 (1837) 44; ed. 2, (1845) 30; ed. 3, **3** (1877) 56, saltem pro parte.

PHILIPPINES (634 *Cuming*.). LUZON, Manila (31 *McGregor*) October, 1904; (93 *Merrill*) May, 1902: Province of Union, Bauang (5653 *Elmer*) February, 1904: Province of Benguet, Bued River (4312 *Merrill*) November, 1905: Province of Bataan, Lamao (1935 *Borden*) October, 1904. MINDORO, Calapan (896 *Merrill*) April, 1903. NEGROS, Gimagaan River (1633 *Whitford*) May, 1906. MINDANAO, Lake Lanao, Camp Keithley (97, 263 *Clemens*) January, February, 1906.

British India to southern China, Malaya, east Australia to Polynesia. Abundant and widely distributed in the Philippines. T., *Taláhib.*

Var. **luzonicum** Hack. in DC. Monog. Phan. **6** (1889) 116.

LUZON, (*Chamisso*) in herb. berol., fide Hackel.

Endemic.

(3) **Saccharum arundinaceum** Retz. Obs. **6:** 14; Hack. in DC. Monog. Phan. **8** (1889) 117; Hook. f. Fl. Brit. Ind. **7** (1897) 119; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 349. *Erianthus* sp. Pilger in Perk. Frag. Fl. Philip. (1904) 137.

MINDORO, Baco River (1794 *Merrill*) April, 1903. MINDANAO, Province of Surigao, Catel (5448 *Merrill*) October, 1906; Lake Lanao, Camp Keithley (97a *Clemens*) January, 1906.

India and Ceylon to southern China.

(9) POLLINIA Trin.

Racemes usually digitate, seldom arranged in panicles. First and second empty glumes chartaceous or membranous, the third hyaline. Flowering glumes awned from the apex or from the cleft; awns twisted or geniculate, rarely wanting.

Species about 36, tropical and subtropical regions of the Old World; 9 in the Philippines.

1. Spikelets clothed with silky hairs. (Subgenus EULALIA.)
   2. Second glume awned.
      3. Awn 1 to 2 cm. long, short ciliate or nearly glabrous on the twisted portion .... (1) *P. articulata*
      3. Awn 3 to 5 cm. long, long ciliate-barbate on the twisted portion .... (2) *P. irritans*
   2. Second glume muticous or mucronulate, not awned.
      3. Hairs of the inflorescence white.
         4. First glume of the sessile spikelet 4-nerved .... (3) *P. quadrinervis*
         4. First glume nerveless .... (4) *P. argentea*
      3. Hairs of the inflorescence ferruginous.
         4. Culms pubescent below the inflorescence; spikelets 4–5 mm. long; awn of the fourth glume 12–15 mm. long; hairs of the inflorescence ferruginous .... (5) *P. cumingii*
         4. Culms glabrous below the inflorescence; spikelets 3.5 mm. long; awn of the fourth glume 6 mm. long; hairs of the inflorescence cinereous-fulvous .... (6) *P. maritima*
1. Spikelets usually hairy only on the callus, rarely also on the keels. (Subgenus LEPTATHERUM.)
   2. Racemes exceeding 3 cm. in length; stamens 3.
      3. Third glume wanting, the fourth minute .... (10) *P.* sp.
      3. Third glume present.
         4. Articulations of the racemes pilose .... (7) *P. imberbis*
         4. Articulations of the racemes glabrous or obscurely ciliate .... (8) *P. nuda*
   2. Racemes less than 3 cm. long; stamens 1 .... (9) *P. tenuis*

(1) **Pollinia articulata** Trin. in Mém. Acad. St. Pétersb. IV. **4** (1836) 90, subsp. **fragilis** var. **setifolia** Hack. in DC. Monog. Phan. **6** (1889) 154; Pilger in Perk. Frag. Fl. Philip. (1904) 138. *Pollinia setifolia* Nees in Hook. Kew Gard. Misc. **2** (1850) 88; Miq. Fl. Ind. Bat. **3** (1859) 531; F.-Vill. Nov. App. (1883) 315; Vidal Rev. Pl. Vasc. Filip. (1886) 290; Phan. Cuming. Philip. (1885) 158; Ceron, Cat. Pl. Herb. (1892) 182. *Pollinia articulata* F.-Vill. l. c. 315, non Trin. *Andropogon koretrostachys* Trin. Mém. Acad. St. Pétersb. VI. **2**

(1833) 273; Miq. Fl. Ind. Bat. **3** (1859) 484; F.-Vill. Nov. App. (1883) 316. *A. asthenostachys* Steud. Syn. **1** (1855) 381; Miq. Fl. Ind. Bat. **3** (1859) 485. *Eulalia contorta* O. Ktz. Rev. Gen. Pl. (1891) 775.

LUZON, Province of Nueva Vizcaya, Quiangan (317 *Merrill*) June, 1902.

Southern China, the species and other varieties extending from British India to Malaya and Australia.

(2) **Pollinia irritans** (R. Br.) Hack. in DC. Monog. Phan. **6** (1889) 155; Philip. Journ. Sci. **1** (1906) Suppl. 265. *Saccharum irritans* R. Br. Prodr. (1810) 203. *Erianthus irritans* Kunth Rev. Gram. **1** (1829) 160; Enum. **1** (1833) 479. *Eulalia irritans* O. Ktz. Rev. Gen. Pl. (1891) 775.

LUZON, Province of Benguet, Ambuklao to Daklan (4388 *Merrill*) October, 1905.

Australia (Queensland).

(3) **Pollinia quadrinervis** Hack. in DC. Monog. Phan. **6** (1889) 158; Govt. Lab. Publ. **35** (1905) 79; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 356. *Eulalia quadrinervis* O. Ktz. Rev. Gen. Pl. (1891) 775.

LUZON, Province of Benguet, Baguio (5783 *Elmer*) March, 1904: Baguio to Ambuklao (4354 *Merrill*) October, 1905: District of Lepanto, Mount Data (4560 *Merrill*) November, 1905.

China, Japan, and north India.

(4) **Pollinia argentea** (Brongn.) Trin. in Mém. Acad. St. Pétersb. VI. **4** (1836) 90; Hack. in DC. Monog. Phan. **6** (1889) 162; Hook. f. Fl. Brit. Ind. **7** (1897) 111. Pilger in Perk. Frag. Fl. Philip. (1904) 138. *Eulalia argentea* Brongn. Voy. Coq. Bot. (1829) 92. *Eulalia tristachya* O. Kuntze Rev. Gen. Pl. (1891) 775.

LUZON, Manila (10 *F. Lamson-Scribner*), June, 1902: Province of Benguet, Twin Peaks (6474 *Elmer*) June, 1904: Province of Nueva Vizcaya, Bagabag (108 *Merrill*) June, 1902. SEMERARA (4152 *Merrill*) June, 1905.

British India to Malaya and Australia.

Pollinia argentea Trin. var. **lagopus** Hack. in Govt. Lab. Publ. **35** (1905) 79; Philip. Journ. Sci. **1** (1906) Suppl. 265. *Pollinia speciosa* Pilger in Perk. Frag. Fl. Philip. (1904) 138, non Hack.

CULION (472 *Merrill*) December, 1902. LUZON, Province of Pampanga, Mount Arayat (3902, 4222 *Merrill*) October, 1904, September 1905: Province of Benguet. Baguio to Ambuklao (4365 *Merrill*) October, 1905: District of Lepanto, Mount Data (4535 *Merrill*) November, 1905.

Endemic, the species and other varieties extending from British India to Malaya and Australia.

(5) **Pollinia cumingii** Nees in Hook. Kew Journ. **2** (1850) 98; Steud. Syn. **1** (1855) 373; Hack. in DC. Monog. Phan. **6** (1889) 167; Miq. Fl. Ind. Bat. **3** (1859) 522; Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 290; Pilger in Perk. Frag. Fl. Philip. (1904) 138; Hook. f. Fl. Brit. Ind. **7** (1897) 114; Rendle in Forbes & Hemsl. Journ. Linn. Soc. **36** (1904) 355. *Pollinia aurea* F.-Vill. Nov. App. (1883) 315, non Benth. *Eulalia fulva* O. Ktz. Rev. Gen. Pl. (1891) 775.

PHILIPPINES (1538 *Cuming.*) LUZON, Province of Nueva Ecija, Carranglang (260 *Merrill*) May, 1902: Province of Benguet, Bued River (4293 *Merrill*) November, 1905.

China, northern India to Malaya and New Guinea.

(6) **Pollinia maritima** Merrill, sp. nov.

Glabra; culmis ascendentibus, 50–80 cm. altis, glaberrimis, apice nudis; foliis 5–7 cm. longis, 4–5 mm. latis, glaberrimis, plus minus involutis; racemis 3–5, articulis pedicellis spiculisque villis cinereo-fulvis vestitis, 5–7 cm. longis, subgracilibus; spiculis sessilibus oblongis, 3.5 mm. longis, gluma tertia carentibus, quartia hyalina, angusta, circiter 1 mm. longa, apice in lacinias duas cuspidatas fissa; arista ad 6 mm. longa; staminibus 3.

An erect or ascending rigid glabrous perennial grass from rather long creeping rootstocks. Culms glabrous, 50 to 80 cm. tall, rather slender; nodes many. Sheaths rather loose, glabrous, crowded and imbricate below, much exceeding the internodes, ligule very short, minutely ciliate; blades smooth, glabrous, rather rigid, 5 to 7 cm. long, 4 to 5 mm. wide, somewhat involute, the base contracted to the petiole-like sheath, the apex acuminate. Racemes 3 to 5, approximate at the end of the glabrous culm, usually exserted, 5 to 7 cm. long, the rhachis, pedicels, and spikelets cinerous-fulvous with rather short villous hairs. Sessile spikelets oblong, 3.5 mm. long, the first and second glumes subequal, truncate, ciliate at the apex, the backs in the lower $\frac{2}{3}$ and margins villous, the second obovate, truncate, 3-toothed; third glume wanting; fourth hyaline, narrow, about 1 mm. long, the apex cleft and bearing a slender nearly straight awn about 6 mm. long. Stamens 3; anthers oblong, about 3 mm. long. Pedicellate spikelets similar to the sessile ones, the pedicels about 3 mm. long.

LUMBACAN (near BALABAC) (5277 *Merrill*) October 7, 1906. On sandy beach associated with *Spinifex squarrosus* Linn.

Evidently related to *Pollinia cumingii* Nees, differing from that species in its smaller spikelets, differently colored shorter, less dense pubescence of the inflorescence, rigid habit, shorter leaves, much shorter awns, and in the culm being quite glabrous below the inflorescence.

(7) **Pollinia imberbis** Nees. var. *β*. **willdenowiana** Hack., forma **monostachya** (Franch. et Savat.) Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 265. *Pollinia japonica* var. *monostachya* Franch. et Savat.

LUZON, Province of Benguet, Pauai (4707 *Merrill*) November, 1905.

The species and varieties extending from northern India to Japan, China, and Java, the form from Japan and the Philippines.

(8) **Pollinia nuda** Trin. in Mém. Acad. St. Pétersb. VI. **4** (1833) 307; Hack. in DC. Monog. Phan. **6** (1889) 178; Philip. Journ. Sci. **1** (1906) Suppl. 265; Hook. f. Fl. Brit. Ind. **7** (1897) 117; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 356. *Eulalia nuda* O. Ktz. Rev. Gen. Pl. (1891) 775.

LUZON, Province of Benguet, Mount Tonglon (4842 *Merrill*) November, 1905; Pauai (4727 *Merrill*) November, 1905. SAMAR, Catubig River (5212 *Merrill*) October, 1906. BALUT (5426 *Merrill*) October, 1906.

Japan to China and northern India; a variety in south Africa.

(9) **Pollinia tenuis** Trin. in Mém. Acad. St. Pétersb. VI. **2** (1833) 307; Hack. in DC. Monog. Phan. **6** (1889) 181; F.-Vill. Nov. App. (1883) 315; Miq. Fl. Ind. Bat. **3** (1859) 521. *Pleuroplitis producta* Griseb. in Ledeb. Fl. Ross. **4**:

478. *Andropogon productus* Regel in Bull. Acad. St. Pétersb. **5** (1866) 760. *t. 2. ff. 16–24.* *Eulalia tenuis* O. Ktz. Rev. Gen. Pl. (1891) 775.

LUZON, Province of Benguet, Bued River (4310 *Merrill*) November, 1905; Ambuklao to Daklan (4382 *Merrill*) October, 1905: Province of Bataan, Lamao River (3286 *Merrill*) October, 1903.

Caroline Islands (Ualan).

(10) **Pollinia** sp. near *P. monantha* Nees.

LUZON, Province of Benguet, Baguio (6524 *Elmer*) June, 1904.

(10) POLYTRIAS Hack.

A low postrate grass with shining red-brown hairy racemes, each joint of the rhachis bearing two sessile and one pedicellate spikelets. Flowering glume with a terminal awn.

A monotypic genus, Java and Singapore, apparently introduced into the Philippines.

(1) **Polytrias amaurea** (Büse) O. Kuntze Rev. Gen. Pl. (1891) 788. *Andropogon amaurus* Büse in Miq. Pl. Jungh. (1854) 360. *Polytrias praemorsa* Hack. in DC. Monog. Phan. **6** (1889) 189; Merr. in Govt. Lab. Publ. **6** (1904) 7; Pilger in Perk. Frag. Fl. Philip. (1904) 138. *Pollinia praemorsa* Nees in Steud. Syn. **1** (1855) 409; Miq. Fl. Ind. Bat. **3** (1859) 520.

LUZON, Manila (386 *Merrill*) December, 1902.

Java, Singapore.

(11) POGONATHERUM Beauv.

Spikelets very small, the second empty glume and the flowering glume with long delicate awns. Delicate grasses, with solitary spicate inflorescence.

Species two, British India to Japan and Malaya; one in the Philippines.

(1) **Pogonatherum saccharoideum** Beauv. Agrost. (1812) 9. *t. 11 f. 7;* Hack. in DC. Monog. Phan. **6** (1889) 192; Hook. f. Fl. Brit. Ind. **7** (1897) 141; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1906) 357.

LUZON, Province of Benguet, Baguio (5915 *Elmer*) March, 1904.

India, China, and Malaya.

Var. **monandrum** (Roxb.) Hack. in DC. Monog. Phan. **6** (1889) 193; Rendle in Forbes & Hemsl. in Journ. Linn. Soc. Bot. **36** (1906) 357; Pilger in Perk. Frag. Fl. Philip. (1904) 138. *P. saccharoideum* F.-Vill. Nov. App. (1883) 316; Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 290; Ceron Cat. Pl. Herb. (1892) 182; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 26. *P. crinitum* Trin.; Miq. Fl. Ind. Bat. **3** (1859) 516; Usteri, Beitr. Kenn. Philip. Veg. (1905) 133. *Pogonopsis tenera* Presl Rel. Haenk. **1** (1830) 133. *t. 46;* Scribn. Rept. Mo. Bot. Gard. **10** (1899) 52. *pl. 2.* *Andropogon monandrus* Roxb. Fl. Ind. ed. Carey, **1**: 260.

LUZON, Province of Benguet, Suyoc to Pauai (4721 *Merrill*) November, 1905: Province of Union, Bauang (5589 *Elmer*) February, 1904: Province of Rizal, Montalban (*Merrill*) March, 1906: Province of Bataan, Lamao River (621 *Borden*) April, 1904; (10 *Whitford*) April, 1904; (6696 *Elmer*) November, 1904; Dinalupijan (1544 *Merrill*) February, 1903: Province of Nueva Ecija (269 *Merrill*) May, 1902. MINDORO, Baco River (252 *McGregor*) April, 1905. PALAWAN (708 *Merrill*) February, 1903; (716 *Foxworthy*) March, 1906. MINDANAO, Lake Lanao, Camp Keithley (146 *Clemens*) February, 1906: District of Davao, Mount Apo (362 *DeVore & Hoover*) May, 1903.

Widely distributed in the Philippines. India to Japan and Malaya.

(12) **ROTTBOELLIA** L. f.

False spikes cylindrical or slightly compressed; first glume coriaceous, covering the excavation in the rhachis-joint. Spikelets awnless. Coarse erect grasses.

Species about 30, tropics of both hemispheres; three in the Philippines.

1. Pedicel of the first spikelet connate with the joint of the rhachis; sheaths tuberculate-hispid .... (1) *R. exaltata*
1. Pedicels free; sheaths glabrous.
    2. First glume coriaceous, the margins below with 5 to 7 upturned mucros or tubercles .... (2) *R. glandulosa*
    2. First glume chartaceous, the margins below smooth .... (3) *R. ophiuroides*

Subgenus COELORHACHIS.

(1) **Rottboellia exaltata** Linn. f. Suppl. (1790) 114; Nees. in Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 173; Miq. Fl. Ind. Bat. **3** (1859) 407; Hack. in DC. Monog. Phan. **6** (1889) 293; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 290; F.-Vill. Nov. App. (1883) 314; Hook. f. Fl. Brit. Ind. **7** (1897) 156; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1906) 362; Pilger in Perk. Frag. Fl. Philip. (1904) 138. *Rottboellia setosa* Presl Rel. Haenk. **1** (1830) 329; Kunth Enum. **1** (1833) 466. *Aegilops fluviatilis* Blanco, Fl. Filip. ed. 1 (1837) 47; ed. 2 (1845) 32; ed. 3, **1** (1877) 59. *Rottboellia denudata* Steud. Syn. **1** (1855) 362; Miq. Fl. Ind. Bat. **3** (1859) 408; F.-Vill. Nov. App. (1883) 314. *R. coelorhachis* F.-Vill. Nov. App. (1883) 314, probabiliter! non Forst. *Manisuris exaltata* O. Kuntze Rev. Gen. Pl. (1891) 779.

PHILIPPINES (562 *Cuming*) 1836–40. LUZON, Province of Nueva Vizcaya, Dupax (212 *Merrill*) May, 1902: Province of Union (6 *Fenix*) October, 1905; (5688 *Elmer*) February, 1904: Province of Pampanga (4234 *Merrill*) September, 1905. MINDORO, Calapan (989 *Merrill*) April, 1903. MINDANAO, Lake Lanao (633 *Clemens*) July, 1906.

Tropical Asia, Africa, Malaya, Australia, and America.

(2) **Rottboellia glandulosa** Trin. in Mém. Acad. St. Pétersb. VI. **2** (1833) 250; Pilger in Perk. Frag. Fl. Philip. (1904) 138; Hook. f. Fl. Brit. Ind. **7** (1897) 157; Miq. Fl. Ind. Bat. **3** (1859) 408; Hack. in DC. Monog. Phan. **6** (1889) 302. *Ophiurus muricatulus* Steud. in Zoll. Verz. Ind. Archip. (1854) 57 et Synopsis **1** (1855) 360. *Coelorhachis muricata* Brongn. in Voy. Coqu. Bot. **1** (1829) 65. *t. 14*. *Rottboellia muricata* Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 290; Ceron, Cat. Pl. Herb. (1892) 183; F.-Vill. Nov. App. (1883) 314, non Retz. *Manisuris glandulosa* O. Kuntze Rev. Gen. Pl. (1891) 780.

CULION (505 *Merrill*) December, 1902. PANAY (*Copeland*) January, 1904.

Burma to Java and the Philippines.

(3) **Rottboellia ophiuroides** Benth. Fl. Austral. **7** (1878) 514; Hack. in DC. Monog. Phan. **6** (1889) 303; K. Schum. und Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 169. *Ischaemum rottboelloides* R. Br. Prodr. (1810) 205. *Andropogon rottboelloides* Steud. Synopsis **1** (1855) 382. *Manisuris rottboelloides* O. Kuntze Rev. Gen. Pl. (1891) 779.

LUZON, Province of Benguet, Baguio (5823 *Elmer*) March, 1904; Pauai to Baguio (4691 *Merrill*) November, 1905: Province of Nueva Vizcaya, Bagabag (121 *Merrill*) June, 1902: Province of Tarlac, Concepcion (3629 *Merrill*) November, 1903.

Australia and New Guinea.

Var. **intermedia** Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 265.

LUZON, Province of Benguet, Bugias (4667 *Merrill*) October, 1903; Twin Peaks (6393 *Elmer*) May, 1904.

(*Rottboellia myurus* L. is reported from the Philippines by Ceron, Cat. Pl. Herb. (1892) 181, but the identification was evidently erroneous.)

(13) **MANISURIS** Sw.

A rather slender much branched annual, the leaves cordate at the base. Sessile spikelets 1-flowered, hollow-globose, pitted externally; pedicellate spikelets flat, stiminate or neuter, their pedicels grown to the rhachis.

A monotypic genus; a weed in all tropical countries.

(1) **Manisuris granularis** Linn. f. Nov. Gram. Gen. (1779) 37. *f. 4–7;* Miq. Fl. Ind. Bat. **3** (1859) 409; F.-Vill. Nov. App. (1883) 314; Hack. in DC. Monog. Phan. **6** (1889) 314; Hook. f. Fl. Brit. Ind. **7** (1897) 159; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 363; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 26. *Hackelochloa granularis* O. Kuntze Rev. Gen. (1891) 776.

LUZON, Province of Bataan, Lamao River (3094 *Merrill*) October, 1903: Province of Laguna, Los Baños (*Hallier*) December, 1903: District of Lepanto, Cervantes (4470 *Merrill*) November. 1905: Province of Rizal, Morong (1406 *Ramos*) August, 1906. MINDANAO, Lake Lanao, Camp Keithley (*Clemens*) April, 1906; Davao (*Copeland*) March, 1904. PALMAS (5357 *Merrill*) October, 1906.

Tropics of the World.

(14) **OPHIURUS** Gaertn. f.

Annual or perennial. Spikes solitary or fascicled; lateral spikelets absent or rudimentary and their pedicels grown to the rhachis; sessile spikelets 1-flowered.

Species two, tropical Asia, Africa, and Malaya, both in the Philippines.

1. Spikes 5 to 12, corymbose-fasciculate; spikelets 2-flowered .... (1) *O. exaltatus*
1. Spikes solitary; spikelets 1-flowered .... (2) *O. monostachyus*

(1) **Ophiurus exaltatus** (Linn.) O. Kuntze Rev. Gen. Pl. (1891) 780. *Aegilops exaltata* Linn. Mant. **2** (1771) app. 575. *Ophiurus corymbosus* Gaertn. f. Fruct. **3** (1805–07) 4. *t. 181. f. a.;* F.-Vill. Nov. App. (1883) 314; Hook. f. Fl. Brit. Ind. **7** (1897) 160; Pilger in Perk. Frag. Fl. Philip. (1904) 138. *Rottboellia corymbosa* Linn. f. Suppl. (1781) 114.

LUZON, Province of Nueva Vizcaya, Bagabag (121 *Merrill,* in part) in herb. Berol., fide Pilger l. c.

British India and north Australia.

(2) **Ophiurus monostachyus** Presl Rel. Haenk. **1** (1830) 330; Kunth Enum. **1** (1833) 464; Miq. Fl. Ind. Bat. **3** (1859) 405; F.-Vill. Nov. App. (1883) 314; Vidal Rev. Pl. Vasc. Filip. (1886) 290; Phan. Cuming. Philip. (1885) 158; Hack. in DC. Monog. Phan. **6** (1889) 318; Rendle in Forbes & Hemsl. Journ. Linn. Soc. **36** (1904) 362. *O. undatus* Nees in Hook. Kew Gard. Misc. **2** (1850) 100. *O. undulatus* Miq. Fl. Ind. Bat. **3** (1859) 405.

PHILIPPINES (1339 *Cuming*). LUZON, Manila (3 *Scribner*) June, 1902. MINDANAO, Lake Lanao, Camp Keithley (156 *Clemens*) February, 1906.

Hongkong, Formosa, and Tonkin.

(15) ISCHAEMUM Linn.

Racemes two to many, digitate. Spikelets broad, the pedicellate like the sessile but frequently unawned, rarely staminate or empty. First empty glume coriaceous or membranous, obtuse, often 2-toothed. Flowering glume awned from the apex or from the notch. Mostly low grasses with rather broad leaves.

Species about 40, tropics of both hemispheres, 7 in the Philippines.

1. Articulations and pedicels 3-angled; inflorescence glabrous or slightly ciliate or pilose, the hairs white.
    2. First glume of the sessile spikelet transversely rugose.
        3. First glume nearly flat, with 2 to 4 marginal nodules or low transverse ridges; perennial .... (1) *I. aristatum*
        3. First glume strongly convex, closely transversely ridged; annual .... (2) *I. rugosum*
    2. First glume of the sessile spikelet not transversely rugose.
        3. Spikes two.
            4. Fourth glume of the sessile spikelet unawned; a maritime grass.......... (3) *I. muticum*
            4. Fourth glume of the sessile spikelet awned.
                5. Culms erect .... (4) *I. merrillii*
                5. Culms much elongated, prostrate .... (5) *I. arundinaceum radicans*
        3. Spikes five to six.......... (6) *I. intermedium*
1. Articulations and pedicels 2-angled; inflorescence densely ferruginous-villous .... (7) *I. angustifolium*

(1) **Ischaemum aristatum** Linn. Sp. Pl. (1853) 1049, var. **gibbum** (Trin.) Hack. in DC. Monog. Phan. **6** (1889) 204; Pilger in Perk. Frag. Fl. Philip. (1904) 139. *Ischaemum gibbum* Trin. in Mém. Acad. St. Pétersb. VI. **2** (1833) 295; Miq. Fl. Ind. Bat. **3** (1859) 498; F.-Vill. Nov. App. (1883) 315. *Andropogon gibbum* Steud. Syn. **1**. (1855) 376.

LUZON, Province of Isabela, Echague (135 *Merrill*) June, 1902; Province of Nueva Viscaya, Dupax (253 *Merrill*) May, 1902: Manila (69 *McGregor*) October, 1904; (*Scribner*) June, 1902; (*Merrill*) January, 1906. CULION (469, 677 *Merrill*) December, February, 1902–03.

Endemic, i. e., the variety, the species India, China, and Malaya.

(2) **Ischaemum rugosum** Salisb. Ic. (1791) 1. *t. 1.* var. **distachum** (Cav.) *I. rugosum* var. *segetum* (Trin.) Hack. in DC. Monog. Phan. **6** (1889) 208; Pilger in Perk. Frag. Fl. Philip. (1904) 139. *Colladoa distachya* Cav. Icon. **5** (1799) 37. *t. 460*. *Ischaemum colladoa* R. Br. Prodr. (1810) 205; Kunth. Enum. **1** (1833) 513; Miq. Fl. Ind. Bat. **3** (1859) 498. *Ischaemum segetum* Trin. in Mém. Acad. St. Pétersb. VI. **2** (1833) 294. *Andropogon segetum* Steud. Synopsis **1** (1855) 376. *Andropogon ramosus* Blanco, Fl. Filip. ed. 1 (1837) 37; ed. 2 (1845) 25, ed. 3, 1 (1877) 47, non Forsk. *I. ciliare* F.-Vill. Nov. App. (1883) 315, non Retz. *I. rugosum* Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 290; Rolfe in Journ. Bot. **23** (1885) 216.

PHILIPPINES (565 *Cuming*). LUZON, Province of Bataan, Dinalupijan (1550 *Merrill*) February, 1903: Province of Zambales, Subic (*Hallier*) December, 1903. Sp.-Fil. *Trigo, Tinitrigo.*

India, China, and Malaya.

(3) **Ischaemum muticum** Linn. Sp. Pl. (1753) 1049; Miq. Fl. Ind. Bat. **3** (1859) 496; F.-Vill. Nov. App. (1883) 315; Hook. f. Fl. Brit. Ind. **7** (1897)

132; Pilger in Perk. Frag. Fl. Philip. (1904) 139. *I. glabratum* Presl Rel. Haenk. **1** (1830) 328; Kunth Enum. **1** (1833) 513; Miq. Fl. Ind. Bat. **3** (1859) 498; F.-Vill. Nov. App. (1883) 315. *Andropogon muticus, repens, polymorpus* et *relictus* Steud. Synopsis **1** (1855) 374, 375, 377.

MINDORO, Caguray (931 *Merrill*) April, 1903; Bulalacao (915 *Merrill*) April, 1903. NEGROS, Gimagon River (*Copeland*) January, 1904. MINDANAO, Zamboanga (*Hallier*) February, 1904. PALMAS (5365 *Merrill*) October, 1906.

British India to Malaya and Australia.

(4) **Ischaemum merrillii** Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 266.

LUZON, District of Lepanto, Balili (4622 *Merrill*) November, 1905.

Endemic.

(5) **Ischaemum arundinaceum** F. Muell. var. **radicans** Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 266.

LUZON, Province of Benguet, Baguio (4274 *Merrill*) October, 1905.

Endemic, i. e., the variety; the species known only from north Australia.

(6) **Ischaemum intermedium** Brongn. in Duperr. Voy. Coqu. Bot. (1829) 73; Hack. in DC. Monog. Phan. **6** (1889) 234; Pilger in Perk. Frag. Fl. Philip. (1904) 139. *Andropogon medius* Steud. Synopsis **1** (1855) 382. *A. paniceus* Steud. l. c. 375.

LUZON, Manila (68 *Merrill*) May, 1902. SAMAR, Tubig (5222 *Merrill*) October, 1906; Catubig River (5213 *Merrill*) October, 1906.

Caroline Islands.

(7) **Ischaemum angustifolium** (Trin.) Hack. ex Oliver in Hook. Icon. Pl. (1888) *t. 1773;* DC. Monog. Phan. **6** (1889) 241; Hook. f. Fl. Brit. Ind. **7** (1897) 129; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 364. *Spodiopogon angustifolius* Trin. in Mém. Acad. St. Pétersb. VI. **2** (1833) 300; Sp. Gram. *t. 336;* Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 290; Ceron Cat. Pl. Herb. (1892) 182. *Spodiopogon laniger* Nees in Steud. Synopsis **1** (1855) 373. *S. notopogon* Nees l. c. *Andropogon notopogon, obvallatus* et *involutus* Steud. ll. cc. *Ischaemum notopogon* Nees in Miq. Fl. Ind. Bat. **3** (1859) 500; F.-Vill. Nov. App. (1883) 315.

PHILIPPINES (1002 *Cuming*). LUZON, Province of Nueva Vizcaya, Quiangan (117 *Merrill*) June, 1902.

India to China, Formosa, and the Philippines.

EXCLUDED SPECIES.

ISCHAEMUM MINUS Presl Rel. Haenk. **1** (1830) 329; Kunth Enum. **1** (1833) 514; Miq. Fl. Ind. Bat. **3** (1859) 498; F.-Vill. Nov. App. (1883) 315=*Ischaemum urvilleanum* Kunth! a South American species. Erroneously credited to the Philippines by Presl.

ISCHAEMUM TIMORENSE Kunth, and I. POLYSTACHYUM Presl, both credited to the Philippines by F.-Villar Nov. App. (1883) 315. No specimens of Villar's plants extant; undoubtedly erroneous identifications.

(16) EREMOCHLOA Busc.

Low, slender grasses. Racemes solitary, densely flowered, unilateral. Spikelets broad, awnless, the margins of the glumes pectinate.

Species 8, eastern and southern Asia to Malaya and Australia; 1 in the Philippines.

(1) **Eremochloa ciliaris** (Linn.) *Nardus ciliaris* Linn. Sp. Pl. (1753) 53. *Eremochloa leersioides* Hack. in DC. Monog. Phan. **6** (1889) 264; Hook. f. Fl.

Brit. Ind. **7** (1897) 140; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 363; Pilger in Perk. Frag. Fl. Philip. (1904) 139; Merr. in Govt. Lab. Publ. **8** (1904) 6. *Ischaemum leersioides* Munro in Proc. Amer. Acad. **4**: 363; Benth Fl. Hongk. (1861) 425.

LUZON, Province of Isabela, Echague (138 *Merrill*) June, 1902.

Southern China to Pegu and Tonkin.

(17) APLUDA Linn.

A leafy, rather slender, tall, subscandent grass; much branched. Racemes fascicled, enclosed in the sheaths, the fascicles in false panicles interspersed with numerous leaves. Callus of the sessile spikelets spherical, the other two spikelets, one staminate and one rudimentary, upon broad flat pedicels.

Species one with many varieties, British India to southern China, Malaya, Australia, and Polynesia.

(1) **Apluda mutica** Linn. Sp. Pl. (1753) 82; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 379; Nees in Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 192; F-Vill. Nov. App. (1883) 318; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 292. *Apluda varia* Hack. in DC. Monog. Phan. **6** (1889) 196, subsp. *mutica*, var. *humilis* (Presl) Hack. l. c. 198; Pilger in Perk. Frag. Fl. Philip. (1904) 139. *Calamina humilis* Presl Rel. Haenk. **1** (1830) 344. *Calamina mutica* R. et S. Syst. **2** (1817) 810. *Apluda cumingii* Büse Pl. Reinw. 105; F-Vill. Nov. App. (1883) 318; Miq. Fl. Ind. Bat. **3** (1859) 501. *Apluda ? humilis* Kunth Enum. **1** (1833) 517; F.-Vill. l. c. 318.

PHILIPPINES (635 *Cuming*). LUZON, Province of Benguet, Baguio (6295 *Elmer*) May, 1904; (134 *Topping*) January, 1903: Province of Nueva Viscaya, Quiangan (110 *Merrill*) June, 1902: Manila (629 *Merrill*) December, 1902 CULION (685 *Merrill*) February, 1903. MINDANAO, Lake Lanao, Camp Keithley (15 *Clemens*) December, 1905: District of Davao (102 *DeVore & Hoover*) April, 1903; (370 *Copeland*) March, 1904: Province of Zamboanga (*Hallier*) February, 1904.

India, China, Malaya, Australia, and Polynesia.

Var. **aristata** (Linn.) Rendle in Forbes & Hemsl Journ. Linn. Soc. Bot. **36** (1904) 279. *Apluda aristata* Linn. Amoen. Acad. **4** (1759) 303; F.-Vill. Nov. App. (1883) 318; Usteri Beitr. Kenn. Philip. Veg. (1905) 132. *Apluda varia* subsp. *aristata* Hack. in DC. Monog. Phan. **6** (1889) 199.

PHILIPPINES, fide F.-Villar et Usteri ll. cc.

India, China, and Malaya.

Forma **intermedia** (Hack.). *Apluda varia mutica intermedia* Hack. in DC. Monog. Phan. **6** (1889) 198.

LUZON, Manila (Robertus in herb. berol.), fide Hack. l. c.

(18) ARTHRAXON Beauv.

Slender small grasses, the racemes usually digitate, spike-like. Spikelets awned.

Species 9, tropical and subtropical regions of the Old World, 2 in the Philippines.

1. Spikes few, two to four, densely pilose with long white hairs............ (1) *A. microphyllus*
1. Spikes many, sometimes few, glabrous or the rhachis slightly ciliate, never densely pilose........................ .... (2) *A. ciliaris*

(1) **Arthraxon microphyllus** (Trin.) Hochst. in Flora **39** (1856) 189; Hack. in DC. Monog. Phan. **6** (1889) 351; Philip. Journ. Sci. **1** (1906) Suppl. 265; Hook. f Fl. Brit. Ind. **7** (1897) 147. *Andropogon microphyllus* Trin. Mém. Acad. St. Pétersb. VI. **2** (1833) 275.

LUZON, District of Lepanto, Mount Data (4485 *Merrill*) November, 1905: Province of Benguet, Baguio to Ambuklao (4363 *Merrill*) October, 1905; Suyoc to Pauai (4719 *Merrill*) November, 1905.

British India to Ceylon and Tonkin.

(2) **Arthraxon ciliaris** Beauv. Agrost. (1812) 111. *t. 11. f. 6.* subsp. **langsdorffii** (Trin.) Hack. in DC. Monog. Phan. **6** (1889) 354; Philip. Journ. Sci. **1** (1906) Suppl. 265; Rendle in Forbes & Hemsl Journ. Linn. Soc. Bot. **36** (1904) 360; Pilger in Perk. Frag. Fl. Philip. (1904) 139. *Arthraxon ciliare* F.-Vill. Nov. App. (1883) 315.

LUZON, Province of Nueva Viscaya, Quiangan (102 *Merrill*) June, 1902: District of Lepanto, Balili (4628 *Merrill*) November, 1905. MINDANAO, Lake Lanao, Camp Keithley (100 *Clemens*) January, 1906.

China and Japan.

Subsp. **nudus** (Nees) Hack. in DC. Monog. Phan. **6** (1889) 356; Philip. Journ. Sci. **1** (1906) Suppl. 266.

LUZON, Province of Benguet, Kabayan (4427 *Merrill*) October, 1905.

British India.

Subsp. **quartinianus** (A. Rich.) Hack. in DC. Monog. Phan. **6** (1889) 365; Philip. Journ. Sci. **1** (1906) Suppl. 266.

LUZON, Province of Benguet (4272, 4677, 4704 *Merrill*) October-November, 1905.

(19) ANDROPOGON Linn.

Racemes solitary or in pairs, digitate or panicled. Rhachis and callus of the first empty glume usually hairy. Spikelets usually narrow, the pedicellate ones staminate, empty or reduced to the pedicel, its flowering glume awnless, but the first glume occasionally awned.

A polymorphous genus of about 200 species in all tropical and temperate regions; 18 in the Philippines.

1. Sessile spikelets of the lowest pairs in each raceme like those above as regards sex, form, and awns. (Series A. *Isozygi.*)
    2. Racemes slender, solitary, usually smooth, terminal, the thickened joints of the rhachis with a cup or tooth-like appendage at the apex. Flowering glume often cleft nearly to the base, awned from the cleft; second empty glume awnless. Slender grasses. (Subgenus SCHIZACHYRIUM.)
        3. Leaves obtuse; 1 to 3 cm. long; articulations and pedicels glabrous; awn of the sessile spikelet 8 to 12 mm. long .... (1) *A. brevifolius*
        3. Leaves acute, 4 to 6 cm. long; pedicels frequently ciliate; awn of the sessile spikelet 16 to 18 cm. long .... (2) *A. fragilis*
    2. Like subgenus *Schizachyrium*, but the spikelets laterally compressed, the second empty glume awned, the flowering glume slightly notched at the apex. (Subgenus DIECTOMIS.)
        3. A rather coarse erect grass, the awns of the sessile spikelets 3 to 4 cm. long .... (3) *A. fastigiatus*

2. Racemes digitate or panicled, all pedicellate. Rhachis joints and pedicels with a median longitudinal translucent line. Flowering glume pedicel-like, tapering into an awn. (Subgenus AMPHILOPHIS.)
  3. Spikes with many pairs of spikelets.................... (4) *A. intermedius*
  3. Spikes one to three, rarely four pairs of spikelets, the rhachis and branches capillary........ (5) *A. micranthus*
2. Racemes in panicles, frequently with few fertile spikelets. Rhachis joints without a translucent line. Empty glume usually broadly lanceolate, finally indurated and shining; second glume awnless; third glume hyaline, 2-nerved; fourth entire or 2-fid, awned, rarely unawned. (Subgenus SORGHUM.)
  3. Very coarse erect grasses.
    4. Annual; spikelets awned or awnless; cultivated only .... (7) *A. sorghum*
    4. Perennial; spikelets awnless.................. (6) *A. halepensis*
  3. Slender grasses.
    4. Awns 2.5 to 3 cm. long............................ (9) *A. baileyi*
    4. Awns 1.5 cm. long or less, or wanting.
      5. Spikelets awnless .... (8) *A. serratus nitidus*
      5. Spikelets awned.
        6. Spikelets 4 to 5 mm. long, brown, shining, clothed with brown hairs............ (8) *A. serratus genuinus*
        6. Spikelets about 2 mm. long, pale or green; panicles very delicate .... (10) *A. leptos*
2. Racemes very many, in whorls upon slender pedicels; these are arranged above one another, forming a panicle. Sessile spikelets laterally or dorsally compressed, awned or not distinguished from the next (*Chrysopogon*) by the absence of a beard or rigid hairs on the tips of the branchlets. (Subgenus VETIVERIA.)
  3. A stout erect tufted grass with aromatic roots, with many-jointed spikes and muricate glumes .... (11) *A. squarrosus*
2. Racemes whorled, pedicellate on the capillary branches of an erect panicle, usually reduced to one or two terminal joints. Spikelets somewhat laterally compressed. (Subgenus CHRYSOPOGON.)
  3. Stem creeping, the flowering branches erect, the callus long, acicular.. (12) *A. aciculatus*
1. Sessile spikelet of the lowest pair or of several of the lower pairs in each raceme, differing from the upper pairs in sex or awns, or empty. (Series B. *Heterozygi.*)
  2. Racemes usually three to many, digitate, all pedicellate or all sessile, not subtended by a leaf-sheath. Flowering glume usually stalk-like. (Subgenus DICHANTHIUM.)
    3. A slender erect grass with digitate, densely villous racemes .... (13) *A. sericeus*
  2. Racemes solitary or terminal upon the culm or its branches. Spikelets imbricated, the first to fifth pairs homogamous. Awns large, those of all the spikelets with a pointed callus. (Subgenus HETEROPOGON.)
    3. First glume flat dorsally...................................... (15) *A. contortus*
    3. First glume deeply channeled dorsally............. (14) *A. triticeus*
  2. Racemes in pairs, terminal upon the culm or its branches, one sessile, always with 1 to 2 basal homogamous pairs of staminate spikelets, the other short pedicelled, with or without homogamous pairs, both together subtended by a sheathing leaf, frequently arranged in a false panicle interrupted by leaves. (Subgenus CYMBOPOGON.)

3. Column of awn of the fourth glume glabrous; aromatic grasses.
    4. First glume of the sessile spikelet dorsally flat with a deep narrow longitudinal cleft in the center below, the keels narrowly winged from or above the middle .... (17) *A. schoenanthus*
    4. First glume of the sessile spikelet dorsally flat or with shallow depressions or concave toward the base winged or wing-margined .... (16) *A. nardus*
3. Column of awn of the fourth glume hirsute; plants inodorous .... (18) *A. filipendulus*

Subgenus SCHIZACHYRIUM.

(1) **Andropogon brevifolius** Sw. Prodr. (1788) 26; Hack. in DC. Monog. Phan. **6** (1889) 363; Rolfe in Journ. Bot. **23** (1885) 216; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291; Hook. f. Fl. Brit. Ind. **7** (1897) 165; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 370; Pilger in Perk. Frag. Fl. Philip. (1904) 139; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 26.

LUZON, Province of Nueva Viscaya, Quiangan (103 *Merrill*) June, 1902: Province of Bataan, Lamao (6785 *Elmer*) November, 1904; (3306 *Merrill*) October, 1903. MINDANAO, Lake Lanao, Camp Keithley (155 *Clemens*) February, 1906.

Tropics of the world.

(2) **Andropogon fragilis** R. Br. Prodr. (1810) 202; Benth. Fl. Austral. **7** (1878) 535. *Andropogon brevifolius* Sw., var. *fragilis* Hack. in DC. Monog. Phan. **6** (1889) 364.

MINDANAO, Lake Lanao, Camp Keithley (95 *Clemens*) January, 1906.

Northern Australia and Queensland.

Var. **luzoniensis** Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 267.

LUZON, Province of Benguet, Ambuklao to Daklan (4386 *Merrill*) October, 1905: District of Lepanto, Cervantes to Mancayan (4466 *Merrill*) November, 1905.

Endemic.

Subgenus DIECTOMIS.

(3) **Andropogon fastigiatus** Sw. Prodr. (1788) 26; Hack. in DC. Monog. Phan. **6** (1889) 393; Hook. f. Fl. Brit. Ind. **7** (1897) 167; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 371; Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 267.

LUZON, District of Lepanto, Cervantes to Balili (4461 *Merrill*) November, 1905.

Tropics of both hemispheres.

Subgenus AMPHILOPHIS.

(4) **Andropogon intermedius** R. Br. Prodr. (1810) 202; Benth. Fl. Austral. **7** (1887) 531; Hack. in DC. Monog. Phan. **6** (1889) 485; Usteri Beitr. Kenn. Philip. Veg. (1905) 132; Hook. f. Fl. Brit. Ind. **7** (1897) 175; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 373.

SEMERARA (4142 *Merrill*) July, 1905. "Somewhat intermediate between the type and the variety *haenkei*," Hackel.

China and Australia varieties extending to British India, Caucasas, tropical and south Africa, and Polynesia.

Var. **haenkei** (Presl) Hack. in DC. Monog. Phan. **6** (1889) 486; Pilger in Perk. Frag. Fl. Philip. (1904) 139. *A. haenkei* Presl Rel. Haenk. **1** (1830) 340; Kunth Enum. **1** (1833) 501; Miq. Fl. Ind. Bat. **3** (1859) 489; F.-Vill. Nov.

App. (1883) 316. *Andropogon leptanthus* Steud. Syn. **1** (1855) 391; Miq. Fl. Ind. Bat. **3** (1859) 489; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291; Ceron Cat. Pl. Herb. (1892) 183; F.-Vill. Nov. App. (1883) 316. *Rhaphis stricta* Nees in Hook. Kew Journ. **2** (1850) 95.

PHILIPPINES (1400 *Cuming*). LUZON, Province of Nueva Viscaya, Dupax (313 *Merrill*) May, 1902; near Quiangan (*Merrill*) June, 1902: Province of Union, Bauang (5735 *Elmer*) February, 1904: Province of Rizal, Morong (1426 *Ramos*) August, 1906. MINDANAO, Province of Surigao, Caraga (5456 *Merrill*) October, 1906.

Southern China and Ceylon.

(5) **Andropogon micranthus** Kunth Rev. Gram. **1** (1835) 165; Enum. **1** (1833) 504; Hack. in DC. Monog. Phan. **6** (1899) 488 (var. *geniunus*); Hook. f. Fl. Brit. Ind. **7** (1897) 178; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 374; Pilger in Perk. Frag. Fl. Philip. (1904) 140. *Andropogon alternans* Presl Rel. Haenk. **1** (1830) 342. *A. parvispica* Steud. Syn. **1** (1855) 397. *Chrysopogon violascens* Trin. in Mém. Acad. St. Pétersb. VI. **2** (1833) 319. *C. villosulus* Vid. Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291; Ceron Cat. Pl. Herb. (1892) 133.

PHILIPPINES (980, 1397 *Cuming*). LUZON, Province of Benguet (6593 *Elmer*) June, 1904; (4434, 4703 *Merrill*) October-November, 1905: Province of Nueva Viscaya, Bagabag (118 *Merrill*) June, 1902.

British India to Japan, Malaya, and Australia.

Var. **spicigerus** (Benth.) Hack. in DC. Monog. Phan. **6** (1889) 489. Philip. Journ. Sci. **1** (1906) Suppl. 267. *Chrysopogon parviflorus* var. *spicigerus*. Benth. Fl. Austral. **7** (1878) 538.

LUZON, Province of Benguet, Mount Tonglon (4836 *Merrill*) November, 1905; Baguio (4854 *Curran*) August, 1906.

China, Australia, and New Caledonia.

Subgenus SORGHUM.

(6) **Andropogon halepensis** (Linn.) Brot. Fl. Lusit. **1** (1804) 89. var. **propinquus** (Kunth). *Andropogon propinquus* Kunth Enum. **1** (1833) 502. *A. affinis* Presl Rel. Haenk. **1** (1830) 343, non R. Br. *A. sorghum* subsp. *halepensis* Hack., var. *propinquus* Hack. in DC. Monog. Phan. **6** (1889) 503; Pilger in Perk. Frag. Fl. Philip. (1904) 140; Usteri Beitr. Kenn. Philip. Veg. (1905) 132. *Sorghum halepanse* Pers. Syn. **1** (1804) 101; F.-Vill. Nov. App. (1883) 317; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291. *Andropogon halepensis* Usteri Beitr. Kenn. Philip. Veg. (1905) 132.

LUZON, Province of Cagayan, Tuguegarao (185 *Bolster*) October, 1905: Province of Rizal, Morong (1374 *Ramos*) August, 1906: Province of Laguna, Los Baños (*Hallier*) December, 1903: Province of Tayabas, Atimonan (46 *Gregory*) August, 1904: Province of Nueva Viscaya, Dupax (259 *Merrill*) May, 1902: Province of Pampanga, Arayat (1468 *Merrill*) March, 1903. MINDORO, Baco River (122 *McGregor*) April, 1905. BALABAC (490 *Mangubat*) March, 1906. MINDANAO, District of Davao (466 *Copeland*) March, 1904; (281 *DeVore & Hoover*) April, 1903: Lake Lanao, Camp Keithley (398 *Clemens*) March, 1906. PALMAS (5362 *Merrill*) October, 1906.

Ceylon, Moluccas, and Amboina, i. e., the variety; the species widely distributed in tropical and warm regions of the world.

(7) **Andropogon sorghum** (Linn.) Brot. Fl. Lusit. **1** (1804) 88; Kunth Enum. **1** (1833) 581; Hack. in DC. Monog. Phan. **6** (1889) 500; Hook. f. Fl. Brit. Ind. **7** (1897) 183. *A. sorghum* Brot., subsp. *sativus* Hack., var. *saccharatus* Hack. in DC. Monog. Phan. **6** (1889) 505; Pilger in Perk. Frag. Fl. Philip.

(1904) 140. *Sorghum vulgare* Pers. Syn. **1** (1804) 101; Miq. Fl. Ind. Bat. **3** (1859) 502. *S. saccharatum* Pers. l. c. 101; F.-Vill. Nov. App. (1883) 317; Vidal Rev. Pl. Vasc. Filip. (1886) 291; Ceron Cat. Pl. Herb. (1892) 291. *Andropogon sorghum* var. *saccharatum* Usteri Beitr. Kenn. Philip. Veg. (1905) 132. *Holcus saccharatus* Linn. Sp. Pl. (1753) 1047; Blanco Fl. Filip. ed. 1 (1837) 47; ed. 2 (1845) 32; ed. 3, **1** (1877) 58; Naves l. c. *t. 436*. *H. sorghum* Linn. l. c.

CULION (492 *Merrill*) December, 1902. LUZON, Province of Pangasinan, Rosales (47 *Alberto*) May, 1904: Province of Zambales, Subic (*Hallier*) December, 1903. T., V., B., *Batad*.

Generally cultivated in tropical and temperate regions; not spontaneous in the Philippines. Sorghum.

(8) **Andropogon serratus** Thunb. Fl. Jap. (1784) 41; Hack. in DC. Monog. Phan. **6** (1889) 521 (var. *genuinus*). *Sorghum fulvum* Beauv. Agrost. (1812) 164; F.-Vill. Nov. App. (1883) 317; Rendle in Forbes & Hemsl. Journ. Linn. Soc. **36** (1904) 367.

LUZON, Province of Benguet (5958 *Elmer*) March, 1904; (4297 *Merrill*) November, 1905.

Japan to China, Malaya, and Australia.

Var. **nitidus** (Vahl) Hack. in DC. Monog. Phan. **6** (1889) 522; Pilger in Perk. Frag. Fl. Philip. (1904) 140. *Sorghum nitidum* Pers. Syn. **1** (1805) 101. *Holcus nitidus* Vahl Symb. **2** (1791) 102. *Andropogon fuscus* Presl Rel. Haenk. **1** (1830) 342; Kunth Enum. **1** (1833) 503. *Sorghum fuscum* Miq. Fl. Ind. Bat. **3** (1859) 503; F.-Vill. Nov. App. (1883) 317; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291; Ceron Cat. Pl. Herb. (1892) 184. *Andropogon pedicellatus* Steud. Syn. **1** (1855) 394; Miq. Fl. Ind. Bat. **3** (1859) 488; F.-Vill. Nov. App. (1883) 316.

PHILIPPINES (1395 *Cuming*). LUZON, Province of Benguet, Twin Peaks (6471 *Elmer*) June, 1904: Province of Pangasinan, Humingan (263 *Merrill*) May, 1902. SEMERARA (4143 *Merrill*) July, 1905. MINDORO, Calapan (889 *Merrill*) April, 1903. MINDANAO, Davao (183 *DeVore & Hoover*) April, 1903: Lake Lanao (597 *Clemens*) June, 1906.

India to China, Formosa, and Malaya.

Var. **nitidus** Hack. forma **hirsuta** Pilger in Perk. Frag. Fl., Philip. (1904) 140.

LUZON, Province of Isabela, Echague (137 *Merrill*) June, 1902.

(9) **Andropogon baileyi** F. Muell. in Victorian Naturalist **7** (1891) 16; Philip. Journ. Sci. **1** (1906) Suppl. 267. *Sorghum laxiflorum* Bailey Rep. Exp. Bellend. Ker's Range 25, non *Andropogon laxiflorus* Steud.

LUZON, Province of Benguet, Ambuklao to Daklan (4399 *Merrill*) October, 1905. PALMAS (5360 *Merrill*) October, 1906.

Australia.

(10) **Andropogon leptos** Steud. Synopsis **1** (1855) 397; Hack. in DC. Monog. Phan. **6** (1889) 537; Philip. Journ. Sci. **1** (1906) Suppl. 268. *Chrysopogon tener* Nees in Steud. l. c.

LUZON, Province of Benguet, Bued River (4322 *Merrill*) November, 1905.

Distribution unknown, probably southern Asia or Malaya. The type of the species is from "Andor," no other data being given.

Subgenus VETIVERIA.

(11) **Andropogon squarrosus** Linn. f. Suppl. 433; Hack. in DC. Monog. Phan. **6** (1889) 542; Hook. f. Fl. Brit. Ind. **7** (1897) 186. *Andropogon muricatus* Retz. Obs. **3**: 43; **5**: 20; F.-Vill. Nov. App. (1883) 316. *Andropogon festucoides*

Presl Rel. Haenk. **1** (1830) 340; Miq. Fl. Ind. Bat. **3** (1859) 489; Kunth Enum. **1** (1833) 500; F.-Vill. Nov. App. (1883) 316. *Andropogon nardus* Blanco Fl. Filip. ed. 1 (1837) 39; ed. 2 (1845) 27; ed. 3, **1** (1877) 51, non Linn. *Andropogon anias* Llanos Frag. Pl. Filip. (1859) 21, ex descr.

LUZON, Manila (*Scribner*) August, 1902. Province of Pampanga, Arayat (4231 *Merrill*) September, 1905; Calumpit (4240 *Merrill*) September, 1905.

British India, tropical Africa, and Malaya; cultivated in tropical America.

Subgenus CHRYSOPOGON.

(12) **Andropogon aciculatus** Retz. Obs. **5** (1779–91) 22; Hack. in DC. Monog. Phan. **6** (1889) 562; Blanco Fl. Filip. ed. 2 (1845) 26; Pilger in Perk. Frag. Fl. Philip. (1904) 139; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 26. *Chrysopogon aciculatus* Trin. Fund. Agrost. (1820) 188; Miq. Fl. Ind. Bat. **3** (1859) 490; Vidal, Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291; F.-Vill. Nov. App. (1883) 316. *Andropogon subulatus* Presl Rel. Haenk. **1** (1830) 341; Kunth Enum. **1** (1833) 505. *Chrysopogon subulatus* Miq. Fl. Ind. Bat. **3** (1859) 491. *Rhaphis trivalvis* Lour. Fl. Cochinch. (1790) 553; Blanco Fl. Filip. ed. 1 (1837) 45.

PHILIPPINES (555 *Cuming*). LUZON, Manila (367 *Merrill*) July, 1902; (11 *Scribner*) June, 1902: Province of Benguet (6591 *Elmer*) June, 1904: Province of Pangasinan, Rosales (272 *Merrill*) May, 1902: Province of Bataan, Lamao (801 *Borden*) May, 1904; (385 *Whitford*) June, 1904: Province of Pampanga, Bacolor (43 *Parker*) May, 1904. SIBUYAN (17 *McGregor*) July, 1904. PALAWAN (4186 *Curran*) May, 1906. MINDANAO, Davao (225 *DeVore & Hoover*) April, 1903; (549 *Copeland*) March, 1904. Sp.-Fil., *Amores secos.*

Mauritius, tropical Asia, Malaya, Australia, and Polynesia.

Subgenus DICHANTHIUM.

(13) **Andropogon sericeus** R. Br. Prodr. (1810) 201; Hack. in DC. Monog. Phan. **6** (1889) 575; Rolfe in Journ. Bot. **23** (1885) 216; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291; Pilger in Perk. Frag. Fl. Philip. (1904) 140. *Andropogon tenuiculus* Steud. Synopsis **1** (1855) 371. *Heteropogon tenuiculus* Miq. Fl. Ind. Bat. **3** (1859) 494; F.-Vill. Nov. App. (1883) 315.

PHILIPPINES (1398 *Cuming*). LUZON, Province of Nueva Ecija, Carranglang (266 *Merrill*) May, 1902.

Philippines to New Guinea, Australia, and New Caledonia.

Subgenus HETEROPOGON.

(14) **Andropogon triticeus** R. Br. Prodr. (1810) 201; Hack. in DC. Monog. Phan. **6** (1889) 588; Hook. f. Fl. Brit. Ind. **7** (1897) 200. *Andropogon ischyranthus* Steud. Synopsis **1** (1855) 367. *A. liantherus* Steud. l. c. *Heteropogon ischyranthus* Miq. Fl. Ind. Bat. **3** (1859) 493; F.-Vill. Nov. App. (1883) 315. *Heteropogon insignis* Thwaites Enum. Pl. Zeyl. 437; F.-Vill. l. c. 315.

PHILIPPINES (1003 *Cuming*).

British India to Malaya and Australia.

(15) **Andropogon contortus** Linn. Sp. Pl. (1753) 1045; Hack. in DC. Monog. Phan. **6** (1889) 585; Hook. f. Fl. Brit. Ind. **7** (1897) 199; Usteri Beitr. Kenn. Philip. Veg. (1905) 132; Pilger in Perk. Frag. Fl. Philip. (1904) 139; Blanco Fl. Filip. ed. 1 (1837) 38; ed. 2 (1845) 26; ed. 3, **1** (1877) 49. *Heteropogon contortus* Beauv. ex R. et S. Syst. **2** (1817) 836; Miq. Fl. Ind. Bat. **3** (1859) 493; F.-Vill. Nov. App. (1883) 315; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 366. *Heteropogon polystachyus* F.-Vill. Nov. App. (1883) 315, non Schult.

LUZON, Manila (90 *Merrill*) May, 1902; (63 *McGregor*) October, 1904: Province of Nueva Ecija, Humingan (289 *Merrill*) May, 1902: Province of Union, Bauang (5699 *Elmer*) February, 1904: Province of Rizal, Caloocan (3677 *Merrill*) November, 1903.

Nos. 90 and 289 *Merrill* were referred by Pilger l. c. to the subvariety *hispidissimus* Hack., which has been found in the Philippines (1615 *Cuming*). The two numbers are, however, referable to the subvar. *typicus* Hack.

Generally distributed in the warmer parts of the World.

Subgenus CYMBOPOGON.

(16) **Andropogon nardus** Linn. Sp. Pl. (1753) 1046 var. **hamatulus** (Nees) Hack. in DC. Monog. Phan. **6** (1889) 606; Pilger in Perk. Frag. Fl. Philip. (1904) 140; *A. hamatulus* Nees in Hook. et Arn. Bot. Beechy's Voy. (1841) 244; Steud. Syn. **1** (1855) 388 "*hamulatus.*" *A. nardus* Rolfe in Journ. Bot. **23** (1885) 216; Vidal Phan. Cuming. Philip. (1885) 158; Rev. Pl. Vasc. Filip. (1886) 291. *Cymbopogon nardus* Rendle, var. *hamatulus* Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 244. *Anthistiria tortilis* Presl Rel. Haenk. **1** (1830) 347; F.-Vill. Nov. App. (1883) 317.

PHILIPPINES (1000 *Cuming*). LUZON, Province of Nueva Ecija, Carranglang (244 *Merrill*) May, 1902. CAGAYAN DE SULU (5307 *Merrill*) October, 1906.

Formosa and southern China, i. e., variety. The species and other varieties in tropical Asia, Africa, Malaya, and America.

(17) **Andropogon schoenanthus** Linn. Sp. Pl. (1753) 1046; Blanco, Fl. Filip. ed. 1 (1873) 39; ed. 2 (1845) 27; ed. 3, **1** (1877) 50; Hack. in DC. Monog. Phan. **6** (1889) 609; Hook. f. Fl. Brit. Ind. **7** (1897) 204; F.-Vill. Nov. App. (1883) 316. *Cymbopogon schoenanthus* Spreng. Pl. Min. Cogn. Pug. **2** (1815) 14; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 377.

MINDORO, Calapan (*Merrill*) December, 1906.

This species is not a native of the Philippines and is only occasionally cultivated for local use, and not on a commercial scale. I have previously doubted the correctness of Blanco's identification,[6] his description being very imperfect. I have not seen flowering specimens from the Philippines. Well-informed natives state that the species rarely flowers. T., *Salai, Tanglad.* V., *Baliyoco.* Sp.-Fil., *Paja de meca.* The source of Lemon-grass oil of commerce.

Tropical Asia to China and tropical Africa.

(18) **Andropogon filipendulus** Hochstett. in Flora **29** (1846) 115. var. **lachnatherus** (Benth.) Hack. in DC. Monog. Phan. **6** (1889) 635; Philip. Journ. Sci. **1** (1906) Suppl. 267. *Andropogon lachnatherus* Benth. Fl. Austral. **7** (1878) 534.

LUZON, Province of Benguet (4398 *Merrill*) October-November, 1905; (6392 *Elmer*) May, 1904.

Queensland and New South Wales, i. e., the variety; the species and other varieties in British India, Ceylon, and tropical Africa.

Forma **bispiculata** Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 267.

LUZON, Province of Benguet, Bued River (4298 *Merrill*) November, 1904.

Endemic.

EXCLUDED SPECIES.

ANDROPOGON ERIOSTACHYUS Presl Rel. Haenk. **1** (1830) 339; Kunth Enum. **1** (1833) 496; Miq. Fl. Ind. Bat. **3** (1859) 487; F.-Vill. Nov. App. (1883) 316=*Andropogon ternatus* Nees, var. *eriostachyus* (Presl) Hack. in DC. Monog.

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[6] *Publications of the Bureau of Government Laboratories* (1905) **27**: 92.

Phan. **6** (1889) 425. Erroneously credited to the Philippines by Presl, but a tropical American species.

Heteropogon tenellus Schult.; F.-Vill. Nov. App. (1883) 316=*Andropogon tenellus* Roxb.=*Andropogon caricosus* Linn.

A species of British India and Malaya, F.-Villar's record of the plant having been found in the Philippines has never been verified, his identification undoubtedly having been erroneous.

(20) **THEMEDA** Forsk.

Coarse or slender grasses, the racemes united into the false panicles, the lower spikelets of each raceme unawned, staminate forming a false whorl about the 1 to 3 middle perfect spikelets which are long-awned, the fascicles included in a foliaceous bract.

Species nine in the warmer countries of the Old World; two in the Philippines.

1. Involucrant spikelets inserted on a level, all sessile; glumes three. A slender grass........ (1) *T. triandra*
1. Involucrant bristles in superposed pairs; glumes three or four. A very coarse erect grass........ (2) *T. gigantea*

(1) **Themeda triandra** Forsk. Fl. Aeg.-Arab. (1775) 178; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 377; *Themeda forskalii* Hack. in DC. Monog. Phan. **6** (1889) 659; Pilger in Perk. Frag. Fl. Philip. (1904) 140. *Anthistiria ciliata* F.-Vill. Nov. App. (1883) 317, non Linn. *A. depauperata* Anderss. Nov. Act. Upsal. III. **2** (1856) 243; F.-Vill. Nov. App. (1883) 317. *Anthistiria imberbis* Retz. Obs. **3**: 11; Hook. f. Fl. Brit. Ind. **7** (1897) 211.

Luzon, Province of Cagayan (168 *Bolster*) August, 1905: Province of Rizal, Bosoboso (1109 *Ramos*) July, 1906: Province of Nueva Ecija, Carranglang (265 *Merrill*) May, 1902: Province of Benguet (5764 *Elmer*) March, 1904; (4433 *Merrill*) October, 1905; (4928 *Curran*) August, 1906. Semerara (4158 *Merrill*) June, 1905. Busuanga (3551 *Curran*) December, 1905. Mindanao, Zamboanga (*Hollier*) February, 1904.

The above numbers are all referable to the variety *imberbis* Hack. in DC. Monog. Phan. **6** (1889) 661. Variety *vulgaris* Hack., has also been found in the Philippines, fide Hack. l. c. (No. 1637, 1873 *Cuming*).

Warmer parts of the Old World.

(2) **Themeda gigantea** (Cav.) Hack. var. **genuina** Hack. in DC. Monog. Phan. **6** (1889) 670; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 377; Pilger in Perk. Frag. Fl. Philip. (1904) 140. *Anthistiria gigantea* Cav. Icon. **5** (1799) 36. *t. 458;* Hook. f. Fl. Brit. Ind. **7** (1897) 377; Blanco Fl. Filip. ed. 1 (1837) 49; ed. 2 (1845) 33; ed. 3, **1** (1877) 62; F.-Vill. Nov. App. (1883) 317; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 292; Ceron Cat. Pl. Herb. (1892) 184. *Perobachne secunda* Presl Rel. Haenk. **1** (1830) 348. *t. 48;* Kunth Enum. **1** (1833) 485; Miq. Fl. Ind. Bat. **3** (1859) 507; F.-Vill. Nov. App. (1883) 317. *Androscepia gigantea* Brongn. in Duperr. Voy. Coqu. Bot. (1829) 78; Kunth Enum. **1** (1833) 484; Miq. Fl. Ind. Bat. **3** (1859) 506. *Calamina gigantea* R. et S. Syst. **2** (1817) 810, non Beauv.

Luzon, Province of Cagayan (135 *Bolster*) July, 1905: Province of Benguet, Twin Peaks (6429 *Elmer*) June, 1904: Province of Rizal, Tanay (2314 *Merrill*) May, 1903; Bosoboso (961 *Ramos*) June, 1906: Province of Zambales, Subic (2086 *Merrill*) April, 1903: Province of Nueva Ecija, San Jose (294 *Merrill*) May, 1902. Semerara (4156 *Merrill*) June, 1905. Culion (442 *Merrill*) December, 1902.

Endemic, i. e., the var. *genuina;* other varieties extending from British India to China and Malaya.

Var. **vulpina** (Anderss.) Hack. in DC. Monog. Phan. **6** (1889) 673; Pilger in Perk. Frag. Fl. Philip. (1904) 140. *Anthistiria vulpina* Anderss. Nov. Act. Upsal. III. **2** (1856) 423. *Anthistiria arundinacea* Rolfe in Journ. Bot. **23** (1885) 216; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 292; Ceron Cat. Pl. Herb. (1892) 184.

PHILIPPINES (1272 *Cuming*). LUZON, Province of Pangasinan, Rosales (262 *Merrill*) May, 1902.

Philippines and British India.

Subsp. **intermedia** Hack. var. **dubia** Hack. in DC. Monog. Phan. **6** (1889) 675.

PHILIPPINES (1609 *Cuming*) fide Hackel l. c.

Endemic.

Tribe III. **ZOISIEÆ.**

Spikelets solitary or in groups, usually 1-flowered, the flowering glume always awnless, membranous, the empty glumes firmer, frequently awned. Rhachis continuous. Otherwise as in Andropogoneæ. Low grasses.

(21) **PEROTIS** Ait.

Spikelets narrow, delicate, the empty glumes very long-awned, usually standing at right angles to the axis of the long usually slender spikes.

Species three, Tropics of the Old World, two in the Philippines.

1. Leaves flat, 4 to 5 mm. wide; empty glumes including the awns less than 1 cm. long........ (1) *P. indica*
1. Leaves narrow, 1 to 2 mm. wide; short, stiff; empty glumes including the awns about 2 cm. long........ (2) *P. rara*

(1) **Perotis indica** (Linn.) O. Kuntze Rev. Gen. Pl. (1891) 787. *Anthoxanthum indicum* Linn. Sp. Pl. (1753) 28. *Perotis latifolia* Ait. Hort. Kew. **1** (1789) 85; Hook. f. Fl. Brit. Ind. **7** (1897) 98; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 343; Vidal Phan. Cuming. Philip. (1885) 158; F.-Vill. Nov. App. (1883) 313. *P. glabrata* Steud. Syn. **1** (1855) 186; Miq. Fl. Ind. Bat. **3** (1859) 313; F.-Vill. Nov. App. (1883) 313. Presl Rel. Haenk. **1** (1830) 228.

PHILIPPINES (1399 *Cuming*).

Tropical Asia, Africa, and Malaya.

(2) **Perotis rara** R. Br. Prodr. (1810) 172; Benth. Fl. Austral. **7** (1878) 509; F.-Vill. Nov. App. (1883) 314; Miq. Fl. Ind. Bat. **3** (1859) 479; *Xystidium maritimum* Trin. Fund. Agrost. (1820) 102. *t. 2.* ? *X. barbatum* Presl Rel. Haenk. **1** (1830) 228; Scribn. Rept. Mo. Bot. Gard. **10** (1899) 55.

LUZON, District of Lepanto, Suyoc to Cervantes (4447 *Merrill*) November, 1905.

Australia.

This species is reduced by some authors to the preceding, but judging from the material available it is sufficiently distinct. I am not sure of the correctness of the reference of *Xystidium maritimum* Trin., to the present species, as I have not been able to consult Triniu's Fundamenta Agrostographiae, where the species is described. Bentham[7] states that the Philippine form (*Xystidium maritimum*) appears to be intermediate between *P. latifolia*=*P. indica*, and *P. rara*.

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[7] Fl. Austral. **7** (1878) 509.

(22) **ZOISIA** Willd. (*Zoysia* Auct.)

Spikes slender. Spikelets closely appressed; empty glume one compressed, keeled, coriaceous, surrounding the flowering glume and palea. Creeping maritime grasses with erect flowering stems and rigid leaves.

Species two or three, southern and eastern Asia to the Mascarene Islands, Australia, and New Zealand; one in the Philippines.

(1) **Zoisia pungens** Willd. in Ges. Naturf. Fr. N. Schrift. **3** (1801) 441; Miq. Fl. Ind. Bat. **3** (1859) 859; F.-Vill. Nov. App. (1883) 313; Hook. f. Fl. Brit. Ind. **7** (1897) 99; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 344; Pilger in Perk. Frag. Fl. Philip. (1904) 140; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 26. *Agrostis matrella* Linn. Mant. **2**: 185. *Osterdammia matrella* O. Kuntze Rev. Gen. Pl. (1891) 781.

LUZON, Manila (27 *Merrill*) April, 1902: Province of Bataan, Lamao (1303 *Whitford*) June, 1905. PANAY, Iloilo (*Copeland*) January, 1904.

Tropical Asia, Malaya, Australia, and the Mascarene Islands.

(*Lappago racemosa* Honck.=*Tragus racemosus* Scop., has been reported from the Philippines by F.-Villar, Nov. App. (1883) 313, but his record has never been verified. The species is to be expected in the Philippines. Tropics of both hemispheres.)

Tribe IV. **TRISTEGINEÆ.**

Spikelets all perfect, 1 to 2-flowered, in panicled racemes, the rhachis continuous. Empty glumes three, the third sometimes with a staminate flower. Intermediate between *Andropogoneæ* and *Paniceæ*.

(23) **ARUNDINELLA** Raddi.

Spikelets pedicellate, usually in pairs on the panicle branches, the pedicels of unequal length. First empty glume shorter than the others, the second frequently awned, the third awnless, usually enclosing a staminate flower.

Species about 25, mostly in the tropical regions of the Old World, a few in South America and Mexico; three in the Philippines.

1. Fourth glume with three awns, the lateral ones short, capillary........ (1) *A. setosa*
1. Fourth glume with a single awn.
    2. Spikelets about 2.5 mm. long; a slender softly pubescent annual .... (2) *A. agrostoides*
    2. Spikelets 4 to 5 mm. long; perennial.. (2) *A. nepalensis*

(1) **Arundinella setosa** Trin. Diss. **2** (1824) 63; Gram. Pan. (1826) 245; Hook. f. Fl. Brit. Ind. **7** (1897) 70; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 342; F.-Vill. Nov. App. (1883) 318; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 179. *Arundinella stricta* Nees in Hook. Kew. Journ. **2** (1850) 102; Miq. Fl. Ind. Bat. **3** (1859) 520. *A. setosa* Trin. var. *stricta* Pilger in Perk. Frag. Fl. Philip. (1904) 140. *Danthonia luzoniensis* Steud. Syn. **1** (1855) 245; Miq. Fl. Ind. Bat. **3** (1859) 427; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 282; Ceron Cat. Pl. Herb. (1892) 184; F.-Vill. (1883) 319. *Arundinella nervosa* F.-Vill. Nov. App. (1883) 318 ? non Nees.

PHILIPPINES (1415 *Cuming*). LUZON, Province of Benguet (4702, 4271 *Merrill*) October-November, 1905; (5762 *Elmer*) March, 1904: Province of Isabela, Echague (129 *Merrill*) June, 1902.

India and Ceylon to China, Formosa, and Luzon.

(2) **Arundinella agrostoides** Trin. Sp. Gram. Ic. (1836) 23. *t. 265;* Hook. f. Fl. Brit. Ind. **7** (1897) 71; Miq. Fl. Ind. Bat. **3** (1859) 520; F.-Vill. Nov. App. (1883) 318.

PHILIPPINES, fide Hooker f. et Miquel.

British India.

Var. **ciliata** (Roxb.) Hook. f. Fl. Brit. Ind. **7** (1897) 71; Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 268. *Holcus ciliatus* Roxb. Fl. Ind. **1** (1820) 318. *Arundinella ciliata* Nees in Wight Cat. No. 1668.

LUZON, Province of Benguet, Baguio (4328 *Merrill*) October, 1905.

British India.

(3) **Arundinella nepalensis** Trin. Diss. **2** (1824) 62; Sp. Gram. Ic. (1836) *t. 268;* F.-Vill. Nov. App. (1883) 318; Vidal Rev. Pl. Vasc. Filip. (1886) 289; Ceron Cat. Pl. Herb. (1892) 181; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 341. *Arundinella brasiliensis* Hook. f. Fl. Brit. Ind. **7** (1897) 73, in part. *Arundinella miliacea* Nees in Hook. Kew. Journ. **2** (1850) 102; Vidal Phan. Cuming. Philip. (1885) 158.

PHILIPPINES (667 *Cuming*). LUZON, Province of Laguna, Pagsanjan (*Copeland*) February, 1906: Province of Rizal, Tanay (2262 *Merrill*) May, 1903; Montalban (*Merrill*) March, 1906; Bosoboso (30 *Foxworthy*) January, 1906. PALAWAN (856 *Foxworthy*) May, 1906.

India, China, Malaya, and Australia.

Rendle is of the opinion that the Asiatic form is distinct from the American form, the former having larger spikelets than the latter. Hooker reduced the Asiatic form to *Arundinella barsiliensis* Raddi, and if he is correct, then the oldest name for the species is *Arundinella hispida* (Willd.) O. Kuntze (*Andropogon hispidus* Willd. Sp. Pl. **4** (1805) 908). *Andropogon hispidus* Willd., being also a South American plant, Trinius' name is here retained for the species. Hackel in lit. has indicated No. 30 *Foxworthy* as a distinct undescribed species, but the plant is apparently identical with all the other specimens above cited, with the possible exception of No. 856 *Foxworthy.*

(24) **THYSONALAENA** Nees.

A tall coarse grass with very large panicles and innumerable minute spikelets racemosely disposed. Spikelets as in *Panicum* but the flowering glume is delicate and fringed with hairs.

A monotypic genus of tropical Asia and Malaya, the "Tiger Grass" of British India.

(1) **Thysanolaena maxima** (Roxb.) O. Kuntze Rev. Gen. Pl. (1891) 794; Schum. und Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 175; Pilger in Perk. Frag. Fl. Philip. (1904) 141. *Agrostis maxima* Roxb. Fl. Ind. **1** (1820) 319. *Thysanolaena agrostis* Nees in Edinb. New Phil. Journ. **18** (1835) 180; Hook. f. Fl. Brit. Ind. **7** (1897) 61. *T. acarifera* Arn. et Nees in Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 181; Vidal Rev. Pl. Vasc. Filip. (1886) 289; Ceron Cat. Pl. Herb. (1892) 182. *Myriachaeta arundinacea* Zoll. et. Mor. Syst. Verz. Zoll. 101. *Panicum acariferum* Trin. Sp. Gram. Ic. *t. 87.*

LUZON, Province of Benguet, Baguio (5949 *Elmer*) March, 1904: Province of Bataan, Lamao (1126 *Whitford*) March, 1905: Province of Rizal, Montalban

(5050 *Merrill*) March, 1906. MINDORO, Baco River (203 *McGregor*) April, 1905; (1795 *Merrill*) April, 1903. NEGROS, Gimagaan River (1667 *Whitford*) May, 1906. MINDANAO, Province of Misamis, Mataline Falls (3922 *Hutchinson*) March, 1906.

British India and Malaya to New Guinea.

Tribe V. **PANICEÆ.**

Spikelets one or sometimes two flowered, the second flower staminate, very rarely perfect, in the axil of the third glume, arranged in spikes, racemes, or panicles, the axis usually continuous. Flowering glume and palea of the perfect flower always firmer in texture than the empty glumes, unawned, the empty glumes rarely awned.

(25) **PASPALUM** Linn.

Spikelets 1-flowered, usually obtuse, in two to four ranked racemes or spikes, these two to many, digitate or disposed in panicles, seldom solitary. Flowering glume and palea cartilaginous; empty glumes two.

Species about 175 in the tropical and subtropical regions of both hemispheres but most abundant in America; four in the Philippines.

1. Spikes geminate at the ends of the culms.
    2. Leaves broad, flat; spikelets suborbicular, 3 mm. long, the hyaline margins of the second glume ciliate...................... (3) *P. conjugatum*
    2. Leaves distichous, narrow; spikelets ovate-oblong, about 3 mm. long, glabrous.. (4) *P. distichum*
1. Spikes alternate on an elongated rhachis.
    2. Spikelets mostly 4-ranked.. (2) *P. longifolium*
    2. Spikelets 2-ranked .... (1) *P. scrobiculatum*

(1) **Paspalum scrobiculatum** Linn. Mant. (1767) 29; Miq. Fl. Ind. Bat. **3** (1859) 431; Kunth Enum. **1** (1833) 53; F.-Vill. Nov. App. (1883) 310; Vidal Phan. Cuming. Philip. (1885) 156; Rev. Pl. Vasc. Filip. (1886) 286; Ceron Cat. Pl. Herb. (1892) 179; Hook. f. Fl. Brit. Ind. **7** (1897) 10; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 320; Mez in Perk. Frag. Fl. Philip. (1904) 141; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 26. *Paspalum cartilagineum* Presl Rel. Haenk. **1** (1830) 216; Miq. Fl. Ind. Bat. **3** (1859) 432; F.-Vill. Nov. App. (1883) 310; Schum. und Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 175; Scribn. Rept. Mo. Bot. Gard. **10** (1899) 49. *Paspalum villosum* Blanco Fl. Filip. ed. 1 (1837) 40; ed. 2 (1845) 28; ed. 3, 1 (1877) 53 ? non Thunb. *Paspalum sumatrense* Roth; F.-Vill. Nov. App. (1883) 310. *Paspalum kora* Willd. Sp. Pl. **1** (1797) 332; Presl Rel. Haenk. **1** (1830) 216. *Paspalum thunbergii* Kunth ex Steud. Syn. **1** (1855) 28; Mez in Perk. Frag. Fl. Philip. (1904) 141.

LUZON, Manila (8 *Merrill*) April, 1902; (6 *Scribner*) June, 1902: Province of Benguet (4793 *Merrill*) November, 1905; (5759 *Elmer*) March, 1904; (4844 *Curran*) August, 1906: District of Lepanto, Balili (4629 *Merrill*) November, 1905: Province of Nueva Ecija, Carranglang (235 *Merrill*) May, 1902: Province of Bataan, (3140 *Merrill*) October, 1903. CULION (479 *Merrill*) December, 1902. BALABAC (469 *Mangubat*) March, 1906. BASILAN (48 *DeVore & Hoover*) April, 1903. MINDANAO, Lake Lanao, Camp Keithley (*Clemens*) December, 1905.

Tropical and warm countries of the world.

Schumann and Lauterbach retain *Paspalum cartilagineum* Presl, as a distinct species, but I have followed Scribner, who has examined Haenke's specimen on which the species is based, in reducing *Paspalum cartilagineum* Presl to *P. scrobiculatum* Linn., as I can detect no characters in the description of the former by which it can be satisfactorily distinguished from the latter. I can also see no reason for retaining *Paspalum thunbergii* Kunth as a distinct species, assuming that Mez was correct in his identification of some of the specimens referred to that species in Perk. Frag. Fl. Philip. (1904) 141.

Var. **auriculatum** (Presl) *Paspalum ariculatum* Presl Rel. Haenk. **1** (1830) 217; Kunth Enum. **1** (1833) 54; Miq. Fl. Ind. Bat. **3** (1859) 432; F.-Vill. Nov. App. (1883) 217.

PALAWAN (Paragua) Point Separation (820 *Merrill*) February, 1903; Iwahig (843 *Foxworthy*) May, 1906. PALMAS (5361 *Merrill*) October, 1906.

A much more robust form than the species with larger spikelets, possibly the same as the species described by Forster as *Paspalum orbiculare*. (*P. scrobiculatum* Linn. var. γ Kunth Enum. **1** (1833) 53.)

Var **philippinense** var. nov.

Vaginae longe-piloso-ciliatae; spiculae ovatae, acutae, 2.3 mm. longae, bi vel triseriales; glumae 3-nervae, acutae vel leviter acuminatae, pubescentes. Ceteroquin ut *P. scrobiculatum* Linn. *Paspalum thunbergii* Mez in Perk. Frag. Fl. Philip. (1904) 141, pro parte.

CULION (478 *Merrill*) December, 1902. LUZON, Province of Nueva Viscaya, Bayombong (140a *Merrill*) June, 1902: Province of Rizal, Morong (1449 *Ramos*) August, 1906.

Endemic.

(2) **Paspalum longifolium** Roxb. Hort. Beng. (1814) 7; Schum. und Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 176; Mez in Perk. Frag. Fl. Philip. (1904) 141; Ustri Beitr. Kenn. Philip. Veg. (1905) 133. *Paspalum flexuosum* Klein in Presl Rel. Haenk. **1** (1830) 215; Kunth Enum. **1** (1833) 54; Miq. Fl. Ind. Bat. **3** (1859) 433; F.-Vill. Nov. App. (1883) 310.

LUZON, Province of Nueva Viscaya, Bayombong (140 *Merrill*) June, 1902. MINDORO, Calapan (941 *Mangubat*) June, 1906. BOHOL (1250 *McGregor*) June, 1906. MINDANAO, Davao (101 *DeVore & Hoover*) April, 1903; (371 *Copeland*) March, 1904: Lake Lanao, Camp Keithley (399 *Clemens*) March, 1906.

British India to Malaya, New Guinea, and Polynesia.

Hooker f.,[8] reduces this species to *Paspalum scrobiculatum* Linn., and perhaps correctly so. I have referred the form with 2-ranked spikelets to *Paspalum scrobiculatum* Linn., and the form with 4-ranked spikelets to *Paspalum longifolium* Roxb.

(3) **Paspalum conjugatum** Berg. in Act. Helvet. **7** (1772) 129. *t. 8;* Trin. Gram. Pan. 25; Sp. Gram. Ic. *t. 102;* Kunth Enum. **1** (1833) 51; Hook. f. Fl. Brit. Ind. **7** (1897) 11; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 319; Merr. in Govt. Lab. Publ. **6** (1904) 28; Mez in Perk. Frag. Fl. Philip. (1904) 141.

LUZON, Manila (34 *Merrill*) May, 1902; (61 *McGregor*) October, 1904: Province of Principe, Baler (1137 *Merrill*) September, 1902: Province of Tayabas, Sariaya (573 *Whitford*) August, 1904. BASILAN (49, 50 *DeVore & Hoover*) April, 1903. MINDANAO, Lake Lanao, Camp Keithley (147 *Clemens*) February, 1906: District of Davao (180 *DeVore & Hoover*) April, 1903; (575 *Copeland*) March, 1904.

Widely distributed in the Tropics, probably a native of the New World.

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[8] Fl. Brit. Ind. **7** (1897) 11.

(4) **Paspalum distichum** Linn. Amoen. Acad. **5** (1760) 391; Hook. f. Fl. Brit. Ind. **7** (1897) 12; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 319; Usteri Beitr. Kenn. Philip. Veg. (1905) 133; F.-Vill. Nov. App. (1883) 310. *Paspalum longiflorum* Retz.; Presl Rel. Haenk. **1** (1830) 208. *Paspalum digitaria* Poir. in Lan. Encycl. **4:** 316.

LUZON, Province of Pampanga, San Esteban (4253 *Merrill*) September, 1905. SAMAR, Oras (5229 *Merrill*) October, 1906.

Tropical and warm countries generally.

EXCLUDED SPECIES.

PASPALUM ELEGANS Flügge; F.-Vill. Nov. App. (1883) 310, an American species, Villar's identification undoubtedly being erroneous.

PASPALUM CHRYSOTRICHUM Presl Rel. Haenk. **1** (1830) 211; Kunth Enum. **1** (1833) 64; Miq. Fl. Ind. Bat. **3** (1859) 431; F.-Vill. Nov. App. (1883) 310.

"Habitat in Luzonia" Presl. Probably erroneously localized and a native of tropical America, not the Philippines. From the description it appears to be a synonym of *Paspalum aureum* H. B. K., an American species.

PASPALUM BORYANUM Presl Rel. Haenk. **1** (1830) 209; Kunth Enum. **1** (1833) 52; Miq. Fl. Ind. Bat. **3** (1859) 432; F.-Vill. Nov. App. (1883) 310.

"Hab. ad Sorsogon" Presl. Although credited to Luzon by Presl, this may be an American species. It is possibly referable to *Digitaria*.

(26) **DIGITARIA** Scop.

Spikes usually digitately arranged at the summit of the culms. Spikelets narrow, acute or acuminate, in twos or threes on one side of a flat, winged, or triangular rhachis; glumes three or four, the three outer ones membranous, the first often minute or wanting.

Species about 25, widely distributed in tropical and temperate regions, by some authors referred to *Paspalum*, by others to *Panicum;* five species in the Philippines.

1. Spikelets about 3 mm. long.
    2. Spikes many, 10 to 20, scattered or whorled along a somewhat elongated axis .... (2) *D. consanguinea*
    2. Spikes few, 2 to 6, digitate or approximate at the apex of the culm .... (1) *D. sanguinalis*
1. Spikelets about 1.5 mm. long.
    2. Spikes digitate or approximate at the ends of the culms.
        3. Spikes usually two or three, less than 5 cm. long; culms short, erect from a prostrate creeping base .... (3) *D. longiflora*
        3. Spikes 3 to 10, frequently 10 cm. long; culms elongated, erect, the base scarcely prostrate or creeping .... (4) *D. violascens*
    2. Spikes alternate, scattered along the somewhat elongated common rhachis .... (5) *D. pedicellaris*

(1) **Digitaria sanguinalis** (Linn.) Scop. Fl. Carn. ed. 2, **1** (1772) 52; Miq. Fl. Ind. Bat. **3** (1859) 437; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 325. *D. inaequalis* Spreng. Syst. **1** (1825) 271. *D. biformis* Willd. Enum. (1809) 92. *D. radicosa* Miq. Fl. Ind. Bat. **3** (1859) 437. *Panicum sanguinale* Linn. Sp. Pl. (1753) 57. *P. didactylum* Kunth; Hack. in Govt. Lab. Publ. **35** (1905) 80. *P. radicosum* Presl Rel. Haenk. **1** (1830) 297; Kunth Enum. **1** (1833) 81; F.-Vill. Nov. App. (1883) 311, ex descr. *Paspalum sanguinale* Lam. Tabl. Encycl. **1** (1791) 176; Hook. f. Fl. Brit. Ind. **7** (1897) 13. *Paspalum inaequale* Link in Kunth Enum. **1** (1833) 48 ex descr. *Panicum*

horizontale Mey. Prim. Fl. Esseq. (1818) 54. *Syntherisma sanguinalis* Dulac Fl. Hautes Pyr. (1867) 77.

Luzon, Province of Benguet, Bued River (4290 *Merrill*) November, 1905; Baguio (5855 *Elmer*) March, 1904: Province of Nueva Viscaya, Bayombong (303 bis *Merrill*) May, 1902: Province of Union, Bauang (5634, 5678 *Elmer*) February, 1904: Province of Zambales, Iba (330 *Merrill*) June, 1902: Manila (89, 40 *Merrill*) May, 1902. Palawan (4172 *Curran*) May, 1906.

Widely distributed in temperate and tropical regions of the world; exceedingly variable.

(2) **Digitaria consanguinea** Gaudich. in Freyc. Voy. Bot. (1826) 410. *Panicum consanguineum* Kunth Enum. **1** (1833) 46. *Panicum sanguinale* Rolfe in Journ. Bot. **23** (1885) 216; Vidal Rev. Pl. Vasc. Philip. (1886) 286; Phan. Cuming. Philip. (1885) 157, non Linn. *Panicum microbachne* Presl Rel. Haenk. **1** (1830) 298; Kunth Enum. **1** (1833) 81. *Paspalum fasciculatum* Llanos Frag. Pl. Filip. (1851) 23, ex descr.

Philippines (561 *Cuming*). Luzon, Province of Nueva Viscaya, Quiangan (104 *Merrill*) June, 1902: Province of Union, Bauang (5592 *Elmer*) February, 1904: Province of Pampanga, Arayat (4230 *Merrill*) September, 1905: Province of Isabela, Echague (128 *Merrill*) June, 1902. Mindoro, Baco River (211 *McGregor*) April, 1905. Culion (483 *Merrill*) December, 1902. Balabac (441 *Mangubat*) March, 1906. Mindanao, Davao (253, 291, 305 *DeVore & Hoover*) May, 1903.

Malaya, Polynesia.

(3) **Digitaria longiflora** (Gmel.) Pers. Syn. 1 (1805) 85; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 324. *Panicum longiflorum* Gmel. Syst. (1788) 158. *Panicum parvulum* Trin. in Mém. Acad. St. Pétersb. VI. **3** (1835) 205; Mez in Perk. Frag. Fl. Philip. (1904) 142. *Paspalum longiflorum* Retz. Obs. **4**: 15; Hook. f. Fl. Brit. Ind. **7** (1897) 17. *Paspalum brevifolium* Fluegge Monog. (1810) 150; F.-Vill. Nov. App. (1833) 310: *Paspalum fuscescens* Presl Rel. Haenk. **1** 1830) 213, ex descr. *Syntherisma fuscescens* Scribn. Rept. Mo. Bot. Gard. **10** (1899) 49. *pl. 10.*

Luzon, Province of Zambales, Iba (331 *Merrill*) June, 1904: Province of Nueva Ecija, Carranglang (249 *Merrill*) May, 1902: Province of Bataan, Lamao (3268 *Merrill*) October, 1903: Province of Principe, Baler (1129 *Merrill*) September, 1902. Basilan (12 *DeVore & Hoover*) April, 1902. Mindanao, Lake Lanao,, Camp Keithley (93, 152 *Clemens*) January, February, 1906.

Japan to India and Malaya.

Regarding *Paspalum fuscescens* Presl, the type locality is first given "Hab. in regione montana Peruviae," but on page 350 of the same work this is corrected to "Hab. ad Monte-Rey, Californiae." As it is known that a considerable number of Presl's Philippine plants were erroneously labeled as having been collected in and about Monterey, California, it seems probable that the type of *Paspalum fuscescens* was a Philippine and not American plant, and although Scribner considers it a valid species, it seems to me to be referable to *Digitaria longiflora* Pers.

(4) **Digitaria violascens** Link. Hort. Berol. **1** (1827) 229. *Panicum violascens* Kunth Rev. Gram. **1** (1829) 33; Enum. **1** (1833) 84. *Paspalum fuscum* Presl Rel. Haenk. **1** (1830) 214, ex descr.; F.-Vill. Nov. App. (1883) 310. *Syntherisma fusca* Scribn. Rept. Mo. Bot. Gard. **10** (1899) 49. *pl. 11.*

Luzon, Province of Benguet, Pauai to Baguio (4788 *Merrill*) November, 1905. Semerara (4148 *Merrill*) June, 1905. Mindanao, Lake Lanao, Camp Keithley (*Clemens*) December, 1905: District of Davao (397 *Copeland*) March, 1904.

Tropical American, Malaya and southern Asia.

Regarding *Paspalum fuscum* Presl, the place of origin of the type specimen is quite uncertain, Presl stating: "Hab. in Luzonia ? in Peruviae montanis huanoccensibus? Mexico?" Scribner, who has examined Haenke's specimen on which the species was based, considers it a good species and transfers it to *Syntherisma*. Judging from Presl's description and Scribner's figure, the latter based on the type, I should refer *Paspalum fuscum* to *Digitaria violascens* Link.

(5) **Digitaria pedicellaris** (Trin.) *Paspalum pedicellare* Trin. ex Steud. Nomen. ed. 2 (1840) 272; Hook. f. Fl. Brit. Ind. **7** (1897) 19. *Panicum pedicellare* Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 268. *Panicum puberulum* Mez in Perk. Frag. Fl. Philip. (1904) 143, non Kunth?

LUZON, Province of Nueva Viscaya, Bagabag (105 *Merrill*) June, 1902: Province of Bataan, Lamao (3164 *Merrill*) October, 1903: Province of Pampanga, Mount Arayat (4225 *Merrill*) September, 1905.

British India.

I can not distinguish the specimen determined by Mez as *Panicum puberulum* from those determined by Hackel as *P. pedicellare*, the specimens agreeing more closely with the description of the latter. Hooker f., cites the older name *Panicum granulare* Trin., as a synonym, but the description of that species available does not closely apply to our material.

DOUBTFUL AND EXCLUDED SPECIES.

PANICUM ELYTROBLEPHARUM Steud.; F.-Vill. Nov. App. (1883) 311. Credited to the Philippines by F.-Villar, but the record not verified=*Digitaria barbata* Willd. (*Paspalum heteranthum* Hook. f.). A species of the Malayan Peninsula, Java, and China.

PANICUM STIPATUM Presl. Rel. Haenk. **1** (1830) 297; F.-Vill. Nov. App. (1883) 311. "Hab. in Mexico, Luzon?" Presl.=*Digitaria setosa* Desv. (*Syntherisma setosa* Nash) teste Scribn. Rept. Mo. Bot. Gard. **10** (1899) 48. *pl.* 22. An American species.

PASPALUM FILIFORME Sw.; Presl Rel. Haenk. **1** (1830) 214 F.-Vill. Nov. App. (1883) 310=*Digitaria filiformis* Delile (*Syntherisma filiforme* Nash), teste Scribn. Rept. Mo. Bot. Gard. **10** (1899) 49. "Hab. in Luzonia ? Mexico" Presl. An American species.

PASPALUM MOLLE Presl Rel. Haenk. **1** (1830) 213. *Paspalum mollicomum* Kunth Enum. **1** (1883) 310; Miq. Fl. Ind. Bat. **3** (1859) 433; F.-Vill. Nov. App. (1833) 310. *Syntherisma molle* Scribn. Rept. Mo. Bot. Gard. **10** (1899) 50. "Hab. in Luzonia" Presl. Considered by Scribner to be a valid species, but from the description it seems probable that this was an American, and not a Philippine plant, and is possibly referable to *Digitaria serotina* Mich.

(27) **ERIOCHLOA** Kunth.

Spikelets in racemes and these again arranged in simple or compound racemes. Spikelets as in *Paspalum*, but the callus annulate. Flowering glume mucronate or short awned.

Species five, tropical and subtropical regions of both hemispheres; one in the Philippines.

(1) **Eriochloa ramosa** (Retz.) O. Kuntze, Rev. Gen. Pl. (1891) 775; Hack. in Bull. Acad. Int. Bot. **16** (1906) 19. *Millium ramosum* Retz. Obs. **6** (1791) 22. *Paspalus annulatus* Flügge Monog. (1810) 133. *Eriochloa annulata* Kunth Rev. Gram. **1** (1829) 30; Enum. **1** (1833) 73; F.-Vill. Nov. App. (1883) 311; Mez in Perk. Frag. Fl. Philip. (1904) 141; Usteri Beitr. Kenn. Philip. Veg.

(1905) 132. *Eriochloa punctata* F.-Vill. Nov. App. (1883) 310, non Hamilt. *Helopus laevis* Trin. in Spreng. Neue Entd. **2** (1821) 49; Miq. Fl. Ind. Bat. **3** (1859) 434. *Piptatherum annulatum* Presl Rel. Haenk. **1** (1828) 221. *Spermachiton involutum* Llanos Frag. Pl. Filip. (1851) 25. *Milium zonatum* Llanos l. c. 24? *Eriochloa polystachya* Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 230, non H. B. K.

LUZON, Manila (7 *Merrill*) April, 1902: Province of Tayabas, Atimonan (136 *Gregory*) August, 1904; (695 *Whitford*) August, 1904. PALAWAN (4182 *Curran*) May, 1906.

Tropics of the Old World.

Var. **involucrata** Hackel, n. var. in herb.

Pilis pedicellorum densis, spiculam plus minus involucrantibus.

MINDORO, Puerto Galera (3333 *Merrill*) October, 1903. BOHOL (1247 *McGregor*) June, 1906.

(28) ISACHNE R. Br.

Spikelets in panicles, two-flowered, both perfect, the fruiting glumes with the grain falling out of the persistent empty ones. Mostly low grasses.

Species about 25, in the warmer parts of both hemispheres; 6 in the Philippines.

1. Empty glumes glabrous or nearly so.
    2. Spikelets 1.5 mm. long or less; panicles small, rather dense...... (1) *I. minutula*
    2. Spikelets 2 mm. long; panicles often large, diffuse...................... (3) *I. beneckei*
1. Empty glumes hispid.
    2. Spikelets 2 mm. long.. (5) *I. pauciflora*
    2. Spikelets less than 2 mm. long.
        3. Panicles spreading, lax.. (4) *I. debilis*
        3. Panicles reduced to few, 3 to 10 spikelets, scarcely spreading .... (2) *I. myosotis*

(1) **Isachne minutula** (Gaudich.) Kunth Rev. Gram. **2** (1829) *t. 117;* Enum. **1** (1833) 137; Nees in Nov. Act Nat. Cur. **19** (1843) Suppl. **1**: 172; Miq. Fl. Ind. Bat. **3** (1859) 460; F.-Vill. Nov. App. (1883) 321; K. Schum. und Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 180; Mez in Perk. Frag. Fl. Philip. (1904) 141; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 27. *I. pulchella* Mez in Perk. Frag. Fl. Philip. (1904) 141, pro parte. *Panicum minutulum* Gaudich. in Freycin. Voy. Bot. (1826) 410. *Panicum macilentum* Presl Rel. Haenk. **1** (1830) 116; Kunth Enum. **1** (1833) 116; F.-Vill. Nov. App. (1883) 312, ex descr.

LUZON, Manila (*Merrill*) January, 1906: Province of Benguet (4389 *Merrill*) October, 1905: Province of Bataan, Lamao (*Whitford*) September, 1905: Province of Rizal, Morong (1390 *Ramos*) August, 1906: Province of Nueva Viscaya, Quiangan (101 *Merrill*) June, 1902. CULION (462, 467 *Merrill*) December, 1902. BASILAN (44 *DeVore & Hoover*) April, 1903; (*Hallier*) January, 1904. MINDANAO, Davao (583 *Copeland*) March, 1904. BUCAS (5275 *Merrill*) October, 1906.

British India to Malaya and Polynesia; also in South America.

(2) **Isachne myosotis** Nees in Hook. Kew Journ. **2** (1850) 98; Miq. Fl. Ind. Bat. **3** (1859) 462; F.-Vill. Nov. App. (1883) 321; Vidal Phan. Cuming. Philip. (1885) 156; Rev. Pl. Vasc. Filip. (1886) 268; Ceron Cat. Pl. Herb. (1892) 179. *Panicum myosotis* Steud. Syn. **1** (1855) 96.

LUZON, Province of Benguet, Pauai (4709 *Merrill*) November, 1905: District of Lepanto, Balili (4626 *Merrill*) November, 1905. MINDORO, Mount Halcon

(4405 *Merritt*) June, 1906. MINDANAO, Zamboanga, San Ramon (1620 *Copeland*) February, 1905.

Endemic.

I have referred the above specimens to this species with some doubt, as I have not seen No. 946 *Cuming*, on which the species is based. Hackel[9] has referred them to *I. monticola* Büse.

(3) **Isachne beneckei** Hack. in Oesterr. Bot. Zeitschr. **51** (1901) 459; Govt. Lab. Publ. **35** (1905) 79; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 27.

LUZON, Province of Pampanga, Mount Arayat (5019 *Merrill*) February, 1906: Province of Bataan, Mount Mariveles (464 *Whitford*) July, 1904; (3201 *Merrill*) October, 1903: Province of Benguet (4680 *Merrill*) November, 1905: District of Lepanto, Mount Data (4522, 4523, 4544, 4619 *Merrill*) November, 1905.

This is probably the form credited to the Philippines by F.-Villar, Nov. App. (1883) 321, as *Isachne australis* R. Br.

Java.

Var. **magna** n. var.

Culmus erectus, simplex, circiter 1 metralis; paniculae magnae, 15 ad 20 cm. longae, multiflorae; foliis lineari-lanceolatis, 10 ad 18 cm. longis.

LUZON, District of Lepanto, Mount Data (4541 *Merrill*) November, 1905. No. 4372 *Merrill* from Benguet appears to be intermediate between this variety and the species, but nearer the former.

Distinguished from the species by its erect or suberect, simple, much elongated culms, large panicle, and numerous spikelets.

Forma **depauperata** Hackel, n. var. in herb.

Culmus procumbens, ramosus, inferne radicans; folia ovata vel ovato-lanceolata, 1 ad 2 cm. longa; paniculae 1 ad 2 cm. longae, laxae, pauciflorae.

LUZON, District of Lepanto, Mount Data (4489, 4545 *Merrill*) November, 1905.

Distinguished from the species by its more prostrate habit, slender stems, smaller leaves, and small, very few-flowered panicles.

(4) **Isachne debilis** Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 322; Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 268. *I. monticola* Hack. in Govt. Lab. Publ. **35** (1905) 79; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 27, non Büse. *I. pulchella* Mez in Perk. Frag. Fl. Filip. (1904) 141, pro parte, non Roth.; F.-Vill. Nov. App. (1883) 321. ?

LUZON, Province of Bataan, Mount Mariveles (264 *Whitford*) May, 1904; (3245 *Merrill*) October, 1903: Province of Nueva Ecija, Caraballo Sur Mountains (211 *Merrill*) May, 1902: Province of Benguet, Kabayan (4431 *Merrill*) October, 1905; Baguio (5821 *Elmer*) March, 1904: Province of Laguna, Mount Maquiling (5135 *Merrill*) March, 1906.

Formosa.

Var. **incrassata** Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 268.

MINDANAO, District of Davao, Mount Apo (358 *DeVore & Hoover*) May, 1903.

(5) **Isachne pauciflora** Hack. in Govt. Lab. Publ. **35** (1905) 80.

LUZON, Province of Benguet, Baguio (6486 *Elmer*) June, 1904; Bued River (4294 *Merrill*) November, 1905.

Endemic.

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[9] *Phil. Journ. Science* 1 (1906) *Suppl.* 268.

(29) PANICUM Linn.

Spikelets in spikes, racemes, or panicles, 1 to 2-flowered. First empty glume usually smaller than the second and the latter as large as and similar to the third which often encloses a staminate flower. Flowering glume and palea indurated, awnless or very short awned.

Species about 350 in the tropical and temperate regions of the world; 30 in the Philippines.

1. Spikelets terete or dorsally compressed.
    2. Branchlets of the panicle not produced beyond the terminal spikelets into awn-like bristles.
        3. Spikelets 1 to 2-seriate, close-set on the underside of the flat rhachis of a simple spike, the spikes alternally arranged in a simple raceme. (§ PASPALOIDEÆ.)
            4. Spikes shorter than the internodes........... (1) *P. flavidum*
            4. Spikes exceeding the internodes.
                5. Tip of spikes excurrent beyond the upper spikelets, setiform; second glume one half as long as the flowering glume .... (2) *P. punctatum*
                5. Tip of spikes not produced; second glume nearly as long as the flowering glume .... (3) *P. paspaloides*
        3. Spikelets 3–4-seriate, crowded on the under surface of a simple or branched spike, ovoid, the empty glumes usually muricate and the second and third cuspidate or rigidly awned. (§ ECHINOCHLOA.)
            4. Awn of the third glume very short or almost wanting.
                5. A coarse erect grass............................. (5) *P. crus-galli muticum*
                5. A slender low grass, the culms usually prostrate, at least below.................. (4) *P. colonum*
            4. Awn of the third glume elongated, mostly many times longer than the spikelet.
                5. Erect; panicles purplish; spikelets 2 to 3 mm. long.................................. (5) *P. crus-galli*
                5. Prostrate, aquatic; panicles green; spikelets 4 to 5 mm. long................ (6) *P. stagninum*
        3. Spikelets irregularly 1–2-seriate on slender or spiciform branches of a simple raceme, solitary or geminate, distant or crowded, not confined to one side of the rhachis. (§ BRACHIARIA.)
            4. Spikelets silky-villous .... (9) *P. villosum*
            4. Spikelets glabrous.
                5. First glume as long as the spikelet..... (7) *P. ambiguum*
                5. First glume two thirds as long as the spikelet or less.
                    6. Spikelets 1.5 to 3 mm. long.
                        7. Spikes about 2 cm. long; spikelets 1.5 mm. long.. (8) *P. prostratum*
                        7. Spikes 3 to 4 cm. long; spikelets 3 mm. long.... (10) *P. remotum*
                    6. Spikelets 4 mm. long; tips of the empty glumes thickened keeled-apiculate .... (11) *P. crassiapiculatum*
        3. Spikelets small, crowded in spiciform or narrow cylindrical panicles (except *P. auritum*), the flowering glume slightly indurated, narrow, usually much shorter than the third glume. (§ HYMENACHNE.)

- 4. Panicle somewhat open, the branches elongated, ascending .... (13) *P. auritum*
- 4. Panicles dense, cylindrical.
  - 5. Spikelets 4 to 5 mm. long, the outer glumes strongly acuminate; aquatic (12) *P. amplexicaule*
  - 5. Spikelets 3 mm. long or less; empty glumes acute or only slightly acuminate.
    - 6. Panicles dense, cylindrical, about 5 mm. thick; spikelets 3 mm. long .... (14) *P. indicum*
    - 6. Panicles slender, caudiform, about 3 mm. thick; spikelets 1.5 mm. long.............................. (15) *P. myosuroides*

3. Spikelets small, in pairs or fascicles on the filiform branches of a lax simple panicle, the first and second glumes much shorter than the third and fourth. (§ BREVIGLUME.)

- 4. Panicle branches solitary or fascicled, elongated, filiform; spikelets in scattered fascicles .... (16) *P. nodosum*

3. Spikelets solitary, rarely binate, sessiled or pedicelled on the slender branches of a decompound open panicle. (§ EFFUSAE.)

- 4. First glume equaling the spikelet or nearly so.
  - 5. Spikelets obtuse, 1.5 to 2 mm. long.
    - 6. Plant 30 to 40 cm. high; leaves ovate-lanceolate to broadly lanceolate, the base cordate and amplexicaul; spikelets 1.5 mm. long .... (17) *P. brevifolium*
    - 6. Plant 1.5 to 2 m. high, subscandent leaves lanceolate; spikelets 2 mm. long .... (25) *P. luxurians*
  - 5. Spikelets strongly acuminate, 2 to 3.5 mm. long.
    - 6. Spikelets 3 to 3.5 mm. long; leaves about 20 cm. long, tuberculate-pilose .... (27) *P. caudiglume*
    - 6. Spikelets 2 to 2.5 mm. long; leaves 5 cm. long or less, glabrous or nearly so............. (28) *P. mindanaense*
- 4. First glume much shorter than the spikelet.
  - 5. Annual erect leafy grasses.
    - 6. Glabrous .... (20) *P. humile*
    - 6. More or less pubescent or pilose.
      - 7. Spikelets 2 mm. long.
        - 8. Sheaths strongly tuberculate-hispid; leaves and panicles 20 cm. long or more........ (21) *P. caesium*
        - 8. Sheaths slightly pilose to subglabrous; leaves and panicles 15 cm. long or less.......... (22) *P. luzoniense*
      - 7. Spikelets 3 to 4 mm. long.
        - 8. Spikelets turgid, ovate-oblong, acute or cuspidate-acuminate; panicles thyrsiform; cultivated.... (18) *P. miliaceum*

8. Spikelets lanceolate, strongly acuminate; panicles effuse; branches elongated, stiff, filiform .... (19) *P. trypheron*

5. Perennial.

6. First glume very small, suborbicular, nerveless.

7. Spikelets ovate to ovate-lanceolate, acute; stem creeping, stoloniferous; leaves usually convolute, glaucous .... (23) *P. repens*

7. Spikelets lanceolate, acuminate; stem thick; frequently floating; leaves flat .... (24) *P. proliferum*

6. First glume 3 to 5-nerved .... (26) *P. sarmentosum*

2. Panicle branches produced beyond the terminal spikelet into a rigid scabrous awn-like bristle equaling or exceeding the spikelet. (§ PTYCOPHYLLUM.)

3. Panicle decompound; leaves broad, ample, plicate.. (29) *P. palmaefolium*

1. Spikelets strongly laterally compressed.

2. Spikelets minute, panicled; flowering glume semilunar. (§ GIBBOSAE.)

3. Panicles densely flowered; spikelets crowded .... (30) *P. pilipes*

3. Panicles diffuse; spikelets scattered, solitary.

4. Panicles 25 to 40 cm. long, very diffuse ...... (31) *P. patens*

4. Panicles 10 to 15 cm. long, rather narrow.. (32) *P. carinatum*

4. Panicles less than 10 cm. long, often reduced to very few branches .... (33) *P. warburgii*

2. Spikelets about 4 mm. long, distant, subsessile on a slender, simple or sparingly divided rhachis. (§ PSEUDECHINOLAENA.)

3. Empty glumes of the upper spikelets with hooked glands .... (34) *P. uncinatum*

Sect. PASPALOIDEAE.

(1) **Panicum flavidum** Retz. Obs. **4** (1779–91) 15; Kunth Rev. Gram. **1** (1829) 211. *t. 17;* Enum. **1** (1833) 60: Hook. f. Fl. Brit. Ind. **7** (1897) 29; F.-Vill. Nov. App. (1883) 311; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 286; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 27; Mez in Perk. Frag. Fl. Philip. (1904) 142; *Panicum floridum* Usteri Beitr. Kenn. Philip. Veg. (1905) 133. *P. brizoides* Jacq.; Miq. Fl. Ind. Bat. **3** (1859) 445.

PHILIPPINES (560 *Cuming*). LUZON, Manila (68 *McGregor*) October, 1904; (21, 265 *Merrill*) April, July, 1902: Province of Bataan, Lamao (6145 *Leiberg*) July, 1904; Dinalupijan (1526 *Merrill*) January, 1903: Province of Pampanga, Bacolor (35 *Parker*) May, 1904: Province of Tayabas, Atimonan (126 *Gregory*) August, 1904. CEBU (*Barrow*) 1904. PALAWAN (4176, 4185 *Curran*) May, 1906. BASILAN (47 *DeVore & Hoover*) April, 1903. BOHOL (1249 *McGregor*) June, 1906.

Tropical Asia, Africa, and Malaya.

(2) **Panicum punctatum** Burm. Fl. Ind. (1768) 26; Hook. f. Fl. Brit. Ind. **7** (1897) 29. *Panicum fluitans* Retz. Obs. **3** (1779–91) 8 (not **5**: 18, teste Hook. f.); Miq. Fl. Ind. Bat. **3** (1859) 455; Rolfe in Journ. Bot. **23** (1885) 216; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Ceron Cat. Pl. Herb. (1892) 180. *Paspalum pluriracemosum* Steud. Syn. **1** (1855) 27; Miq. Fl. Ind. Bat. **3** (1859) 431; F.-Vill. Nov. App. (1883) 310.

PHILIPPINES (532 *Cuming*) 1836–40. LUZON, Manila (*Merrill*) September, 1906.

British India to Malaya, Mauritius, tropical and north Africa.

(3) **Panicum paspaloides** Pers. Syn. **1** (1805) 81 (*paspalodes*); Kunth Enum. **1** (1833) 77; Steud. Syn. **1** (1855) 60; Hook. f. Fl. Brit. Ind. **7** (1897) 30; F.-Vill. Nov. App. (1883) 311. *P. brizaeforme* Presl Rel. Haenk. **1** (1830) 302; Kunth Enum. **1** (1833) 78; Miq. Fl. Ind. Bat. **3** (1859) 445; F.-Vill. Nov. App. (1883) 311; Scribn. in Rept. Mo. Bot. Gard. **10** (1899) 46. *pl. 16.*

LUZON (*Haenke*) fide *Presl.*

Tropical Asia, Africa, and America.

Sect. ECHINOCHLOA.

(4) **Panicum colonum** Linn. Syst. ed. 10, 870; Steud. Syn. **1** (1855) 46; F.-Vill. Nov. App. (1883) 311; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 286; Hook. f. Fl. Brit. Ind. **7** (1897) 32; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 328; Mez in Perk. Frag. Fl. Philip. (1904) 142. *P. colonum* Linn., var. *pseudocolonum* Nees in Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 172. *P. cumingianum* Steud. Syn. **1** (1855) 58; Miq. Fl. Ind. Bat. **3** (1859) 447; F.-Vill. Nov. App. (1883) 311. *Echinochloa colona* Link Hort. Berol. **2** (1833) 209; Miq. Fl. Ind. Bat. **3** (1859) 463. *Oplismenus echinatus* H. B. K. Nov. Gen. et Sp. Pl. **1** (1815) 108; Kunth Enum. **1** (1833) 142; Presl Rel. Haenk. **1** (1830) 321. *Orthopogon subverticellatus* Llanos Frag. Pl. Filip. (1851) 38.

PHILIPPINES (1422 *Cuming*). LUZON, Manila (362 *Merrill*) July, 1902: Province of Pangasinan, Rosales (288 *Merrill*) May, 1902: Province of Rizal, Morong (1402 *Ramos*) August, 1906: Province of Bataan, Dinalupijan (1549 *Merrill*) January, 1903: Province of Pampanga, Bacolor (57 *Parker*) June, 1904: Province of Principe, Baler (1143 *Merrill*) October, 1902. MINDANAO, Davao (440, 587 *Copeland*) March, 1904. PALAWAN, Point Separation (1793 *Merrill*) February, 1903; Iwahig (871 *Foxworthy*) May, 1906. BALABAC (460 *Mangubat*) March, 1906.

Tropical and warm countries of the World.

(5) **Panicum crus-galli** Linn. Sp. Pl. (1753) 56; F.-Vill. Nov. App. (1883) 311; Hook. f. Fl. Brit. Ind. **7** (1897) 30; Mez in Perk. Frag. Fl. Philip. (1904) 142, pro parte; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 328. *P. limosum* F.-Vill. Nov. App. (1883) 311. *P. hispidulum* Retz.; F.-Vill. l. c. *Echinochloa crus-galli* Beauv. Agrost. (1812) 53; Miq. Fl. Ind. Bat. **3** (1859) 464. *Oplismenus limosus* Presl Rel. Haenk. **1** (1830) 321; Kunth Enum. **1** (1833) 144. *Orthopogon hispidus* Llanos Frag. Pl. Filip. (1851) 37. *Or. loliaceus* Llanos l. c.

LUZON, Manila (5 *Merrill*) April, 1902: District of Lepanto, Balili (4644 *Merrill*) November, 1905: Province of Rizal, Tanay (2269 *Merrill*) May, 1903; Bosoboso (3346 *Ahern's collector*) September, 1905; Morong (1403 *Ramos*) August, 1906: Province of Pampanga, Bacolor (58 *Parker*) June, 1904: Province of Tayabas, Atimonan (21 *Gregory*, 660 *Whitford*) August, 1904.

Warm and temperate regions of the World.

Var. **muticum** Doell.; Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 268.

LUZON, Manila (*Whitford*) August 1905: Province of Benguet, Bued River (4307 *Merrill*) November, 1905; Baguio (6378 *Elmer*) May, 1904.

Distribution of the species.

(6) **P. stagninum** Retz. Obs. **4** (1779–91) 17; F.-Vill. Nov. App. (1883) 311; Usteri Beitr. Kenn. Philip. Veg. (1905) 133. *Echinochloa stagnina* Beauv. Agrost. (1812) 57; Miq. Fl. Ind. Bat. **3** (1859) 464. *Orthopogon dichotomus*

Llanos Frag. Pl. Filip. (1851) 38. *Panicum crus-galli* var. *stagninum* O. Kuntze Rev. Gen. Pl. (1891) 783.

LUZON, Manila (39 *Merrill*) May, 1902: Province of Laguna, Los Baños (5116 *Merrill*) March, 1906: Province of Pampanga, Calumpit (4233 *Merrill*) September, 1905. PHILIPPINES (1422 *Cuming*, pro parte) T., *Balili.*

Tropical Asia and Malaya.

Mez in Perk. Frag. Fl. Philip. (1904) 142, referred No. 39 *Merrill* to *Panicum crus-galli* Linn., but the differences between typical *P. crus-galli* and *P. stagninum* are too great to warrant the reduction of the latter. Regarding our specimen of No. 1422 *Cuming*, both *Panicum colonum* and *P. stagninum* are represented on the sheet. Steudel cites as the type of *Panicum cumingianum* No. 422 *Cuming*, apparently a typographical error for 1422; his description of the species applies to *Panicum colonum* rather than to *P. stagninum*.

Sect. BRACHIARIA.

(7) **Panicum ambiguum** Trin. Mém. Acad. St. Pétersb. VI. **3**² (1835) 243; Steud. Syn. **1** (1855) 61; Hook. f. Fl. Brit. Ind. **7** (1897) 33; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 327; Miq. Fl. Ind. Bat. **3** (1859) 447; F.-Vill. Nov. App. (1883) 311; Mez in Perk. Frag. Fl. Philip. (1904) 141. *Urochloa paspaloides* Presl Rel. Haenk. **1** (1830) 318; Kunth Enum. **1** (1833) 75; Scribn. in Rept. Mo. Bot. Gard. **10** (1899) 54. *pl. 14*, non *Panicum paspaloides* Pers.

LUZON, Province of Nueva Viscaya (120, 307 *Merrill*) May, June, 1902. MINDORO, Puerto Galera (3332 *Merrill*) October, 1903. MINDANAO, Lake Lanao, Camp Keithley (149, 395 *Clemens*) February, March, 1906. PALMAS (5369 *Merrill*) October, 1906.

British India, Mauritius, and Ceylon to Luchu Archipelago, Malaya, Polynesia.

(8) **Panicum prostratum** Lam. Ill. **1** (1791) 171; Kunth Enum. **1** (1833) 89; Steud. Syn. **1** (1855) 62; Miq. Fl. Ind. Bat. **1** (1859) 446; F.-Vill. Nov. App. (1883) 311; Ceron Cat. Pl. Herb. (1892) 180; Hook. f. Fl. Brit. Ind. **7** (1897) 33; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 332; Mez in Perk. Frag. Fl. Philip. (1904) 143. *Panicum crispum* Llanos Frag. Pl. Filip. (1851) 42. *Panicum calacczense* Steud. Syn. **1** (1855) 65; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Ceron Cat. Pl. Herb. (1892) 180.

PHILIPPINES (498 *Cuming.*) (Cotype of *Panicum calacczense* Steud.). LUZON, Province of Isabela (132 *Merrill*) June, 1902: Province of Nueva Viscaya, Bagabag (115 *Merrill*) June, 1902: Province of Union, Bauang (5605 *Elmer*) February, 1904: Province of Pampanga, Arayat (4227 *Merrill*) September, 1905. PANAY (*Copeland*) January, 1904. PALAWAN (4173, 4187 *Curran*) May, 1906; (872 *Foxworthy*) May, 1906. BASILAN (126 *DeVore & Hoover*) April, 1903, depauperate form. PALMAS (5368 *Merrill*) October, 1906.

India to southern China, Formosa, Malaya, and tropical Australia.

(9) **Panicum villosum** Lam. Ill. **1** (1791) 173; Kunth Enum. **1** (1833) 98; Hook. f. Fl. Brit. Ind. **7** (1897) 34; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 333; Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 269.

LUZON, Province of Benguet (4281, 4360, 4396 *Merrill*) October, November, 1905: District of Lepanto (4459 *Merrill*) Nevember, 1905. MINDANAO, Lake Lanao, Camp Keithley (148 *Clemens*) February, 1906.

British India to Tonkin, southern China and Formosa.

(10) **Panicum remotum** Retz. Obs. **4** (1779–91) 71; Kunth Enum. **1** (1833) 125; Steud. Syn. 1 (1855) 68. *Panicum petiveri* Trin. Icon. *t. 176. f. C. Panicum*

ramosum Mez in Perk. Frag. Fl. Philip. (1904) 143, non Linn. *Panicum polygonatum* Llanos Frag. Pl. Filip. (1851) 41. *Panicum umbrosum* F.-Vill. Nov. App. (1883) 311? non Retz. *Panicum distachyum* F.-Vill. Nov. App. (1883) 311? non Linn. *Panicum miliiforme* Presl Rel. Haenk. **1** (1830) 300; Kunth Enum. **1** (1833) 96; Miq. Fl. Ind. Bat. **3** (1859) 448; F.-Vill. Nov. App. (1883) 312; Scribn. Rept. Mo. Bot. Gard. **10** (1899) 47. *pl. 20.*

Luzon, Manila (352 *Merrill*) July, 1902: Province of Zambales, Iba (332 *Merrill*) June, 1902. Mindanao, Lake Lanao, Camp Keithley (*Clemens*) December, 1906.

British India.

Hackel notes on No. 352 *Merrill,* that the plant is *Panicum remotum* Retz., and not *P. ramosum* Linn., proper, as determined by Mez. Scribner is of the opinion that *Panicum miliiforme* Presl is a distinct species, but I can find no characters in the description as given by Presl, or in the figure given by Scribner, drawn from Presl's type material, by which the species can be distinguished from *Panicum remotum* Retz.

(11) **Panicum crassiapiculatum** Merrill, nom. nov. *Panicum latifolium* Hook. f. Fl. Brit. Ind. **7** (1897) 39, excl. syn. et var. *majus,* non Linn.

Balabac (5387 *Merrill*) October, 1906.

Bengal to the Malayan Peninsula.

Panicum latifolium Linn., is confined to North America, the first reference in Linnaeus' Species Plantarum under the description of the species being to Morison's Hist. Pl. **3**: 196. *t. 8. f. 4,* a Virginian plant, of which *Panicum porterianum* Nash is a synonym. The second reference given by Linnaeus is to Sloane Hist. Jam. **1**: 114. *t. 71. f. 3,* an entirely different plant of the West Indies, which is *Panicum divaricatum* Linn. The Asiatic plant referred by Hooker f., to *Panicum latifolium* Linn., is not at all related to that species and has in my opinion little affinity with *Panicum divaricatum* Linn., of the West Indies. As noted by Hooker f., the compressed thickened tips of the empty glumes are very characteristic of the Asiatic form, the Balabac plant closely matching specimens from the Malayan Peninsula.

Sect. HYMENACHNE.

(12) **Panicum amplexicaule** Rudge Pl. Guian. (1805) 21. *t. 27.* Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 327. *Panicum myurus* H. B. K. Nov. Gen. et Sp. Pl. **1** (1815) 98, excl. syn. Lam.; Hook. f. Fl. Brit. Ind. **7** (1897) 39; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 27; Usteri Beitr. Kenn. Philip. Veg. (1905) 133.

Luzon, Manila (*Merrill*) May, 1902: Province of Bataan, Lamao (*Whitford*) September, 1905.

British India to Formosa, Malaya, tropical Australia and South America.

(13) **Panicum auritum** Presl Rel. Haenk. **1** (1830) 305 et var. *procerius* Presl l. c.; Nees Agrost. Bras. (1829) 176; Kunth Enum. **1** (1833) 113; Steud. Syn. **1** (1855) 70; Miq. Fl. Ind. Bat. **3** (1859) 456; Nees in Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 172; F.-Vill. Nov. App. (1883) 312; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Hook. f. Fl. Brit. Ind. **7** (1897) 40; Mez in Perk. Frag. Fl. Philip. (1904) 142; Scribn. Rept. Mo. Bot. Gard. **10** (1899) 46. *pl. 15.*

Philippines (1274 *Cuming*). Luzon, Manila (27 *Merrill*) May, 1902: Province of Tayabas, Atimonan (667 *Whitford*) August, 1904: Province of Bataan, Dinalupijan (1599 *Merrill*) January, 1903: Province of Rizal, Morong (1442 *Ramos*) August, 1906. Culion (476 *Merrill*) December, 1902. Mindanao, District of Davao (129 *DeVore & Hoover*) April, 1903: Lake Lanao, Camp Keithley (151, 400 *Clemens*) February, March, 1906. PALAWAN (845 *Foxworthy*) May, 1906.

British India to Malaya and ? Mauritius.

(14) **Panicum indicum** Linn. Mant. (1767) 184; Kunth Enum. **1** (1833) 133; F.-Vill. Nov. App. (1883) 311; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Hook. f. Fl. Brit. Ind. **7** (1897) 41; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 330; Mez in Perk. Frag. Fl. Philip. (1904) 142; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 27. *Hymenachne indica* Büse in Miq. Fl. Ind. Bat. **3** (1859) 458.

PHILIPPINES (566 *Cuming.*). LUZON, Province of Benguet (5766 *Elmer*) March, 1904: District of Lepanto (4620 *Merrill*) November, 1905: Province of Bataan, Lamao (3109 *Merrill*) October, 1903: Province of Principe, Baler (1139 *Merrill*) September, 1902: Province of Nueva Viscaya, Quiangan (315 *Merrill*) June, 1902. MINDANAO, Lake Lanao, Camp Keithley (94, 157 *Clemens*) January, February, 1906: District of Davao (588 *Copeland*) March, 1904.

Tropical Asia, Malaya, and Australia.

Var. **angustum** (Trin.) Hook. f. Fl. Brit. Ind. **7** (1897) 42; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 330. *Panicum angustum* Trin. Ic. Gram. *t. 334;* Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287.

PHILIPPINES (1667 *Cuming* in part, fide *Vidal*).

British India and southern China.

(15) **Panicum myosuroides** R. Br. Prodr. (1810) 189; Kunth Enum. **1** (1833) 77; Hook. f. Fl. Brit. Ind. **7** (1897) 42; Mez in Perk. Frag. Fl. Philip. (1904) 142. *Panicum angustissimum* Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 286; Ceron Cat. Pl. Herb. (1892) 179, non Hochst.

PHILIPPINES (1668 *Cuming*) 1836–40.

British India and tropical Africa to Malaya and tropical Australia.

Sect. BREVIGLUME.

(16) **Panicum nodosum** Kunth Enum. **1** (1833) 97; Steud. Syn. **1** (1855) 59; Miq. Fl. Ind. Bat. **3** (1859) 448; F.-Vill. Nov. App. (1883) 312; Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 268; Hook. f. Fl. Brit. Ind. **7** (1897) 43, (at least in part); Rendle, Journ. Linn. Soc. **36** (1904) 331. *P. multinode* Presl Rel. Haenk **1** (1830) 303, non Lam. *P. ouonbiense* Balansa in Morot Journ. de Bot. **4** (1890) 141; Mez in Perk. Frag. Fl. Philip. (1904) 142; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 27. *P. violaceum* Llanos Frag. Pl. Filip. (1851) 42.

LUZON, Province of Nueva Viscaya (127 *Merrill*) June, 1902: Province of Nueva Ecija, Caraballo Sur Mountains (255 *Merrill*) May, 1902: Province of Pampanga, Arayat (4228 *Merrill*) September, 1905: Province of Cavite, Maragondong (4182 *Merrill*) July, 1905: Province of Bataan, Lamao (533 *Whitford*) July, 1904: Province of Tayabas, Atimonan (135 *Gregory*) August, 1904. SIBUYAN (13 *McGregor*) July, 1904. CULION (527 *Merrill*) December, 1902. PALAWAN, San Antonio Bay (5247 *Merrill*) October, 1906. BALABAC (5385 *Merrill*) October, 1906. PALMAS (5367 *Merrill*) October, 1906.

Cochin China, and southern China, India, and Malaya.

As noted by Hackel, Balansa apparently described typical *Panicum nodosum* Kunth as *P. ouonbiense.* It is possible that the Indian *Panicum arnottianum* Nees, reduced by Hooker f., to *P. nodosum,* represents a distinct species.

Sect. EFFUSAE.

(17) **Panicum brevifolium** Linn. Sp. Pl. (1753) 59, excl. syn.; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 328; Mez in Perk. Frag. Fl. Philip. (1904) 142. *Panicum ovalifolium* Poir. in Lam. Encycl. Suppl. **4** (1797) 279; Kunth Enum. **1** (1833) 113; Steud. Syn. **1** (1855) 84; Hook. f. Fl. Brit. Ind. **7** (1897) 44.

CULION (458 *Merrill*) December, 1902. BALABAC (442 *Mangubat*) March, 1906; (5386 *Merrill*) October, 1906.

Tropical Africa, India, China, and Malaya.

(18) **Panicum miliaceum** Linn. Sp. Pl. (1753) 58; Kunth Enum. **1** (1833) 104; Steud. Syn. **1** (1855) 77; Hook. f. Fl. Brit. Ind. **7** (1897) 45; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 331.

NEGROS, Tanhay (*José Muñoz*) 1904. Cultivated only, V., *Cabug.*

Widely cultivated in warm countries. Millet.

(19) **Panicum trypheron** Schult. Mant. **2** (1822) 244; Hook. f. Fl. Brit. Ind. **7** (1897) 47; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 333; Mez in Perk. Frag. Fl. Philip. (1904) 143. *Panicum roxburghii* Spreng. Syst. **1** (1825) 320; Kunth Enum. **1** (1833) 126.

SEMERARA (4136 *Merrill*) July, 1905. CULION (678 *Merrill*) February, 1903. MINDANAO, Davao (396 *Copeland*) March, 1904. No. 4478 *Merrill,* from the District of Lepanto, Luzon, differs from the type only in having the pedicels clavate and supplied with few long white hairs.

Tropical Africa to India, southern China and Malaya.

(20) **Panicum humile** Nees ex Steud. Syn. **1** (1855) 84; Hook. f. Fl. Brit. Ind. **7** (1897) 48; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 330; Hack. in Govt. Lab. Publ. **35** (1905) 80.

LUZON, District of Lepanto (4466 *Merrill*) November, 1905: Province of Tarlac, Concepcion (3623 *Merrill*) November, 1903.

British India to southern China and Malaya.

(21) **Panicum caesium** Nees in Hook. Kew Journ. **2** (1850) 97; Hook. f. Fl. Brit. Ind. **7** (1897) 48. *P. reticulatum* Thw. ex Trimen Cat. Ceyl. Pl. 105, non Griseb. *P. acroanthum* Mez in Perk. Frag. Fl. Philip. (1904) 141, non (?) Steud.

LUZON, Province of Nueva Viscaya, Quiangan (123 *Merrill*) June, 1902: Province of Pampanga, Arayat (1469, 4229 *Merrill*) March, 1903; September, 1904.

British India to Malaya.

(22) **Panicum luzoniense** Presl Rel. Haenk. **1** (1830) 308; Kunth Enum. **1** (1833) 121; Miq. Fl. Ind. Bat. **3** (1859) 457; F.-Vill. Nov. App. (1883) 312. *P. psilopodium* Rolfe, Journ. Bot **23** (1885) 216, non Trin.?; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287. *P. caesium* Mez in Perk. Frag. Fl. Philip. (1904) 142, non (?) Nees. *P. trypheron* Merr. Philip. Journ. Sci. **1** (1906) Suppl. 27, non Schult.

PHILIPPINES (1667 *Cuming,* in part). LUZON, Province of Nueva Ecija, Carranglang (316 *Merrill*) May, 1902: Province of Cavite, Maragondong (4183 *Merrill*) July, 1905: Province of Bataan, Lamao (6024 *Leiberg*) July, 1904; (3107 *Merrill*) October, 1903.

Malayan Peninsula.

This species may not be sufficiently distinct from *Panicum caesium* Nees. No. 1667 *Cuming,* in our herbarium, on which the Philippine references to *Panicum psilopodium* is based, is a mixture of *Panicum angustum* Trin., *P. prostratum* Lam., and the species here considered to represent *P. luzoniense.* The specimen before me is very fragmentary, but I can not distinguish it from the other material here referred to *P. luzoniense.*

(*Panicum tuberculatum* Presl Rel. Haenk. **1** (1830) 307; Kunth Enum. **1** (1833) 120; Miq. Fl. Ind. Bat. **1** (1859) 454; F.-Vill. Nov. App. (1883) 312.

"Hab. in Luzonia" Presl.

Hooker f., reduces this to *Panicum maximum* Jacq., but Presl's description does not closely apply to the latter species. I have seen no specimens of *Panicum maximum* from the Philippines, and if it does occur in the Archipelago, it will be only as an introduced plant.)

(23) **Panicum repens** Linn. Sp. Pl. ed 2 (1763) 87; Kunth Enum. **1** (1833) 103; Ceron Cat. Pl. Herb. (1892) 180; Hook. f. Fl. Brit. Ind. **7** (1897) 49; Rendle in Forbes & Hamsl. Journ. Linn. Soc. Bot. **36** (1904) 332; Mez in Perk. Frag. Fl. Philip. (1904) 143. *Panicum ischaemoides* Retz. Obs. **4** (1779–91) 17; Nees in Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 175; Miq. Fl. Ind. Bat. **1** (1859) 450; F.-Vill. Nov. App. (1883) 312. *Panicum miliare* Mez in Perk. Frag. Fl. Philip. (1904) 142, Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 27, non Lam. *P. convolutum* Beauv. ex Spreng. Syst. **1**: 319; Presl Rel. Haenk. **1** (1830) 304; Miq. Fl. Ind. Bat. **3** (1859) 450; F.-Vill. Nov. App. (1883) 312. *Panicum tuberosum* Llanos Frag. Pl. Filip. (1851) 40, teste F.-Vill.

Luzon, Manila (10 *Merrill*) April, 1902; (29 *McGregor*) October, 1904: Province of Bataan, Dinalupijan (1568 *Merrill*) January, 1903; Lamao (*Whitford*) September, 1905: Province of Pampanga, Arayat (10 *Bolster*) May, 1905; near Calumpit (4251 *Merrill*) September, 1905: Province of Zambales, Subic (*Hallier*) December, 1903. Apo (Mindoro Straits), (429 *Merrill*) December, 1902. Mindanao, Lake Lanao, Camp Keithley (154 *Clemens*) February, 1906: Cotabato (*Copeland*) May, 1904.

Tropical and subtropical regions of the World, especially near the seashore.

(24) **Panicum proliferum** Lam. Encycl. **4** (1797) 747; Steud. Syn. **1** (1855) 71; Hook. f. Fl. Brit. Ind. **7** (1897) 50; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 332; Mez in Perk. Frag. Fl. Philip. (1904) 143. *Panicum paludosum* Roxb. in Hort. Beng. 6, nomen, et Fl. Ind. **1**: 307; Usteri Beitr. Kenn. Philip. Veg. (1905) 133.

Luzon, Manila (97 *Merrill*) July, 1902. Possibly referable here are Nos. 5972 and 6589 *Elmer*, from Benguet Province, Luzon.

Tropical Africa to India and Formosa, North and Central America.

(25) **Panicum luxurians** Willd. ex Nees in Mart. Fl. Bras. **2** (1829) 233; Kunth Enum. **1** (1833) 109; F.-Vill. Nov. App. (1883) 312. *P. montanum* Mez in Perk. Frag. Fl. Philip. (1904) 142; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 27; F.-Vill. Nov. App. (1883) 312; (?) Ceron Cat. Pl. Herb. (1892) 180, non Roxb.

Luzon, Province of Union, Bauang (5595 *Elmer*) February, 1904: Province of Bataan, Mount Mariveles (6735 *Elmer*) November, 1904. Culion (554 *Merrill*) December, 1902.

Endemic?

This species has the habit of *Panicum sarmentosum* Roxb., but differs from that and from *Panicum montanum* Roxb., in the long first glume which equals the spikelet in length. Mez identified No. 554 *Merrill* as *Panicum montanum,* but the specimen does not agree with the descriptions of that species. I have based the above identification entirely on the short description of *Panicum luxurians* given by Kunth in his Enumeratio, but the description does not apply in all particulars. *Panicum cordatum* Büse, from Java appears to be the same but with broader leaves. If I have correctly identified Büse's species it is represented in our herbarium by Nos. 15109 and 27781 β Herb. Koorders, and also by specimens from plants cultivated in the Botanical Garden at Buitenzorg.

(26) **Panicum sarmentosum** Roxb. Fl. Ind. **1** (1820) 308; Kunth Enum. **1** (1833) 126; Steud. Syn. **1** (1855) 98; F.-Vill. Nov. App. (1883) 312; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Hook. f. Fl. Brit. Ind. **7** (1897) 54; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 333; Mez in Perk. Frag. Fl. Philip. (1904) 143; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 27. *Panicum vacillans* Steud. Syn. **1** (1855) 75. *P. extensum* Steud. l. c. 72, teste Vidal. *P. incomptum* Trin. Diss. **2**: 200; Icon. 20. *t. 232;* Kunth Enum. **1** (1833) 112; Miq. Fl. Ind. Bat. **3** (1859) 451.

PHILIPPINES (679 *Cuming*). LUZON, Province of Bataan, Lamao (1019 *Whitford*) December, 1904; Dinalupijan (1608 *Merrill*) January, 1903: Province of Zambales, Subic (*Hallier*) December, 1903. MINDORO, Baco River (1668 *Merrill*) January, 1903; (120 *McGregor*) April, 1905. CULION (512 *Merrill*) December, 1902. PALAWAN, Point Separation (825 *Merrill*) February, 1903. BALABAC (452 *Mangubat*) March, 1906.

India to southern China and Malaya.

(27) **Panicum caudiglume** Hack. in Oesterr. Bot. Zeitsch. **51** (1901) 428; Govt. Lab. Publ. **25** (1905) 80; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 27. *Panicum* n. sp.? affinis *Panico trachyrhachidi* Benth., Mez in Perk. Frag. Fl. Philip. (1904) 144.

PALAWAN (Paragua), San Antonio Bay (832 *Merrill*) February, 1903. LUZON, Province of Bataan, Lamao River (3307 *Merrill*) October, 1903.

Java.

(28) **Panicum mindanaense** Merrill, sp. nov.

Glabrum; culmis erectis, 30–40 cm. altis, ramosis, gracilibus, basi subgeniculatis, dense caespitosis; vaginis quam internodiis brevioribus; laminis lanceolatis, 2–5 cm. longis, plus minus 3 mm. latis, acuminatis; paniculis diffusis, ramosis, 10–15 cm. longis, ramis sparsis, remotis, filiformibus; spiculis 2.5–3 mm. longis, acuminatis, pedicellatis, ovato-lanceolatis; gluma prima ovato-lanceolata, spiculae aequante, acuminata.

A glabrous, caespitose grass 30 to 45 cm. high, the culms erect or ascending from somewhat geniculate bases, slender, branched; nodes glabrous. Sheaths lax, glabrous, shorter than the internodes. Panicles diffuse, 10 to 15 cm. long, the branches few, remote, slender, solitary or opposite, spreading or erect-spreading, angular, scabrous, the lower ones 5 to 8 cm. long. Spikelets 2.5 to 3 mm. long, acuminate, pedicellate, ovate-lanceolate, purplish; first glume equaling the spikelet, 5-nerved, ovate-lanceolate; second and third glumes subequal, 5-nerved, acute. Flowering glume elliptical-ovate, glabrous, shining, 1.2 mm. long.

MINDANAO, Lake Lanao, Camp Keithley (99 *Clemens*) January, February, 1906.

A species related to *Panicum trachyrhachis* Benth., and *P. caudiglume* Hack., differing from both in its smaller spikelets and shorter leaves and from the latter in its glabrous leaves, and like those two species recognizable by its very long, acuminate first glume.

Sect. Ptychophyllum.

(29) **Panicum palmaefolium** Koen. in Naturforsch. **23** (1788) 208; Miq. Fl. Ind. Bat. **3** (1859) 449. *Panicum plicatum* Lam. Ill. **1** (1791) 171; Encycl. **4** (1797) 736; F.-Vill. Nov. App. (1883) 311; Mez in Perk. Frag. Fl. Philip. (1904) 143; Hook. f. Fl. Brit. Ind. **7** (1897) 55. *P. amplissimum* Steud. Syn. **1** (1855) 54; Vidal Phan. Cuming. Philip. (1885) 156; Rev. Pl. Vasc. Filip. (1886) 287. *P. neurodes* Schult. Mant. **2** (1824) 228; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Ceron Cat. Pl. Herb. (1892) 180; Usteri Beitr. Kenn. Philip. Veg. (1905) 133. *P. neurodes* var. *amplissimum* Walp. Ann. **6** (1861) 947. *P. nepalense* Spreng. Mant. **2** (1824) 321; Rolfe in Journ. Bot. **23** (1885) 216. *Panicum lene* Steud. Syn. **1** (1855) 54. *Setaria mauritiana* Spreng. Syst. **1** (1825) 305; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **26** (1904) 336. *S. lenis* Miq. Fl. Ind. Bat. **3** (1859) 468.

Philippines (553 *Cuming*). Luzon, Province of Benguet, Baguio (5919 *Elmer*) March, 1904; (4931 *Curran*) August, 1906: District of Lepanto, Balili (4611 *Merrill*) November, 1905: Province of Nueva Viscaya, Quiangan (133 *Merrill*) June, 1902: Province of Tayabas, Mount Banajao (976 *Whitford*) October, 1904. Mindoro, Baco River (305 *McGregor*) May, 1905. Palawan, Puerto Princesa (341 *Bermejos*) January, 1906; Point Separation (815 *Merrill*) February, 1903. Mindanao, Davao (640 *Copeland*) March, 1904: Lake Lanao, Camp Keithley (393 *Clemens*) March, 1906.

Tropical Africa to India, southern China, Japan, and Malaya.

Sect. Gibbosae.

(30) **Panicum pilipes** Nees et Arn. ex Büse in Miq. Pl. Jungh. (1855) 376; Miq. Fl. Ind. Bat. **3** (1859) 453; Hook. f. Fl. Brit. Ind. **7** (1897) 57; Mez in Perk. Frag. Fl. Philip. (1904) 143; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 27. *P. hermaphroditum* Steud. Syn. **1** (1855) 67; Rolfe in Journ. Bot. **23** (1885) 216; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Ceron Cat. Pl. Herb. (1892) 180. *P. trigonum* Nees in Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 172; F.-Vill. Nov. App. (1883) 312, non Retz.

Philippines (554 *Cuming*). Luzon, Province of Nueva Ecija, Caraballo Sur Mountains (*Merrill*) May, 1902: Province of Bataan Dinalupijan (1576 *Merrill*) January, 1903; Lamao River, Mount Mariveles (1821 *Borden*); (1020 *Whitford*); (6650 *Elmer*); (3156 *Merrill*), 1903 to 1905: Province of Rizal (93 *Foxworthy*) January, 1906: Province of Zambales, Subic (*Hallier*) December, 1903: Province of Tayabas, Atimonan (623 *Whitford*) August, 1904. Culion (496 *Merrill*) December, 1902. Mindanao, Lake Lanao, Camp Keithley (*Clemens*) February, 1906: District of Davao (641 *Copeland*) March, 1904. Palawan (589 *Foxworthy*) May, 1906.

British India to Madagascar Islands, Malaya, Australia, and Polynesia.

(31) **Panicum patens** Linn. Sp. Pl. (1753) 86; Kunth Enum. **1** (1833) 126; Hook. f. Fl. Brit. Ind. **7** (1897) 57; Mez in Perk. Frag. Fl. Philip. (1904) 142; Usteri Beitr. Kenn. Philip. Veg. (1905) 133. *Panicum radicans* Retz.; F.-Vill. Nov. App. (1883) 312; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Ceron Cat. Pl. Herb. (1892) 180; Miq. Fl. Ind. **3** (1859) 453; Llanos Frag. Pl. Filip. (1851) 43.

Philippines (493 *Cuming*). Luzon, District of Lepanto (4473 *Merrill*) November, 1905: Province of Nueva Viscaya, Dupax (254 *Merrill*) May, 1902: Province of Rizal, Montalban (3419 *Ahern's collector*) November, 1905; Antipolo (1322 *Merrill*) February, 1903: Province of Zambales, Subic (*Hallier*) December, 1903. Mindoro, Baco River (281 *McGregor*) April, 1905. Palawan, Puerto Princesa (344 *Bermejos*) January, 1906; (730 *Merrill*) February, 1903. Point

Separation (821 *Merrill*) February, 1903. MINDANAO, Lake Lanao, Camp Keithley (153 *Clemens*) February, 1906: District of Davao (252 *DeVore & Hoover*) April, 1903.

British India to southern China, Malaya, and Polynesia.

(32) **Panicum carinatum** Presl Rel. Haenk. 1 (1830) 309; Kunth Enum. 1 (1833) 112; Miq. Fl. Ind. Bat. 3 (1859) 452; F.-Vill. Nov. App. (1833) 312. Scribn. Rept. Mo. Bot. Gard. **10** (1899) 46. *pl. 17*. *Panicum radicans* Mez in Perk. Frag. Fl. Philip. (1904) 143; Merr. in Philip. Journ. Sci. 1 (1906) Suppl. 27, non Retz.

MINDORO, Puerto Galera (3328 *Merrill*) October, 1903. BALABAC (451, 516 *Mangubat*) March, 1906. CULION (477 *Merrill*) December, 1902. BASILAN (70 *DeVore & Hoover*) April, 1903. PALAWAN (826 *Foxworthy*) April, 1906. In Nos. 1520 and 3155 *Merrill* and No. 6646 *Elmer*, from the Province of Bataan. LUZON, the panicle branches and rhachis are supplied with few long white hairs, and Hackel proposes to call this forma *lasiocladum*.

Endemic?

The status of this species is very unsatisfactory, and true *Panicum carinatum* may prove to be an exact synonym of *Panicum patens* Linn. Mez[10] including in *Panicum radicans* Retz., both the form considered above and *Panicum pilipes* Nees et Arn. Schumann and Lauterbach[11] certainly misinterpreted *Panicum carinatum*, as they reduced to it the very different *P. pilipes* Nees et Arn. (*P. hermaphroditum Steud.*). Scribner[12] gives a figure of Haenke's specimen on which *Panicum carinatum* Presl was based, and considers it to be closely allied to and perhaps identical with *Panicum radicans* Retz., which by many authors is considered a synonym of *P. patens* Linn. The figure apparently represents a young stage of the Linnean species. Even if the material here referred to *Panicum carinatum* is correctly identified, it can not be distinguished from *Panicum patens* Linn., except by some minor characters, such as the smaller size of the panicle, but at the same time it is perhaps as distinct from *P. patens* as is the following species.

(33) **Panicum warburgii** Mez in Perk. Frag. Fl. Philip. (1904) 143. *P. patens* Linn. var. *parvulum* Warb. l. c. *P. patens* Linn. var. *warburgii* Hack. in herb.

LUZON, Province of Nueva Viscaya, Bayombong (303 *Merrill*) May, 1902. MINDANAO, Lake Lanao, Camp Keithley (268 *Clemens*) February, 1906.

Endemic.

The validity of this species is very doubtful, and Hackel is doubtless correct in reducing it to a variety of *Panicum patens*. It is apparently only a depauperate condition of that species due to environment.

Sect. PSEUDECHINOLAENA.

(34) **Panicum uncinatum** Raddi Agrost. Bras. (1823) 41; Trin. Gram. Pan. 174; Sp. Gram. Ic. *t. 216;* Kunth Enum. 1 (1833); Miq. Fl. Ind. Bat. 3 (1859) 449; Hook. Fl. Brit. Ind. 7 (1897) 58.

MINDANAO, Lake Lanao, Camp Keithley (266 *Clemens*) February, 1906.

Tropical Asia, Malaya, and America.

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[10] Perk. Frag. Fl. Philip. (1904) 143.

[11] Fl. Deutsch. Schutzgeb. Südsee (1901) 179.

[12] *Rept. Mo. Bot. Gard.* **10** (1899) 46. *pl. 17.*

DOUBTFUL AND EXCLUDED SPECIES.

PANICUM MERTENSII Roth.; F.-Vill. Nov. App. (1883) 312. First credited to the Philippines by Llanos, Mem. Ac. Cienc. Mad. (1858), but certainly erroneously identified. An American species.

PANICUM GAUDICHAUDII Kunth; F.-Vill. l. c. 311. A species of the Marianne Islands. F.-Villar's record for this species as a Philippine plant has never been verified, probably an erroneous identification on his part=*Digitaria stricta* Gaudich.

PANICUM LEUCOPHAEUM H. B. K.; F.-Vill. l. c. 311.

Presl (Rel. Haenk. 1 (1830) 299) states regarding this species "Hab. in Mexico, in Luzonia" from which F.-Villar compiled his record for the Philippines. F.-Villar states, however, that he saw living specimens in Luzon and Panay, which might have been *Panicum villosum* Lam. The species is Mexican, and some Australian forms have been referred to it. It is not to be expected in the Philippines.

PANICUM HELOPUS Trin.; F.-Vill. l. c. 311.=*P. setigerum* Retz., a species of British India, hardly to be expected in the Philippines. F.-Villar reduces to *P. helopus*, *Setaria pilifera* Llanos Frag. Pl. Filip. (1851) 34, and while this reduction is apparently erroneous, I have been unable to determine Llanos's species satisfactorily from his very imperfect description.

PANICUM ELATIUS Kunth Rev. Gram. 1 (1829) 38; F.-Vill. Nov. App. (1883) 312.=*Panicum altissimum* Mey., a species of tropical America. Certainly an erroneous identification on the part of F.-Villar.

(30) **ICHNANTHUS** Beauv.

Similar to *Panicum*, but the flowering glume pedicellate and with two basal appendages or scars.

Species about 20, mostly tropical America, two in tropical Asia; one in the Philippines.

(1) **I. pallens** (Sw.) Munro in Benth Fl. Hongk. (1861) 414; Hook. f. Fl. Brit. Ind. **7** (1897) 60; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1804) 334; Hack. in Govt. Lab. Publ. **35** (1905) 80. *Panicum pallens* Sw. Prodr. (1788) 23; Kunth Enum. 1 (1833) 89. *P. nitens* Merr. Govt. Lab. Publ. **17** (1904) 8.

LUZON, Province of Bataan, Mount Mariveles (3221, 3756 *Merrill*) October, 1903, January, 1904.

Tropics of both hemispheres.

(31) **OPLISMENUS** Beauv.

Spikelets 1-flowered in small groups or clusters along the branches of the panicle, secund; first and second glumes always awned, the third frequently awned.

Species about 6, tropical and subtropical regions of both hemispheres; three in the Philippines.

1. Spikelets about 2 mm. long, greenish, closely imbricate, green; awns capillary .... (1) *O. burmannii*
1. Spikelets 3 to 4 mm. long, loosely imbricate or scattered, often purplish; awns stout.
    2. More or less pubescent; spikes elongated .... (2) *O. compositus*
    2. Glabrous or nearly so; spikes short or reduced to a single fascicle of flowers .... (3) *O. undulatifolius*

(1) **Oplismenus burmannii** (Retz.) Beauv. Agrost. (1812) 54; Kunth Enum. **1** (1833) 139; Hook. f. Fl. Brit. Ind. **7** (1897) 68; F.-Vill. Nov. App. (1883); Merr. Philip. Journ. Sci. **1** (1906) Suppl. 28. *Panicum burmannii* Retz. Obs. **3** (1779–91) 10. *Orthopogon burmannii* R. Br. Prodr. (1810) 194; Miq. Fl. Ind. Bat. **3** (1859) 442.

LUZON, Province of Bataan, Lamao River (3290 *Merrill*) October, 1903; (6645 *Elmer*) November, 1904. MINDANAO, Province of Zamboanga (5483 *Merrill*) October, 1906.

Tropical Africa, Asia to Japan and Malaya.

(2) **Oplismenus compositus** (Linn.) Beauv. Agrost. (1812) 54; Kunth Enum. **1** (1833) 141; F.-Vill. Nov. App. (1883) 312; Mez in Perk. Frag. Fl. Philip. (1904) 144; Hook. f. Fl. Brit. Ind. **7** (1897) 66; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 337; Ceron Cat. Pl. Herb. (1892) 180. *O. indicus* Roem. et Schult. Syst. **2:** 484; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 288; Ceron Cat. Pl. Herb. (1892) 180. *O. sylvaticus* Beauv.; F.-Vill. Nov. App. (1883) 312. *O. loliaceus* Beauv.; Kunth Enum. **1** (1833) 140; F.-Vill. Nov. App. (1883) 312. *Orthopogon hirtellus* Llanos Frag. Pl. Filip. (1851) 37. *Or. setarius?* Llanos l. c. 35. *Or. sylvaticus* Miq. Fl. Ind. Bat **3** (1859) 443. *Panicum compositum* Linn. Sp. Pl. (1753) 57. *P. lanceolatum* Retz.; F.-Vill. Nov. App. (1883) 311.

PHILIPPINES (531 *Cuming*). LUZON, Province of Rizal, Montalban (5072 *Merrill*) March, 1906; Antipolo (2 *Foxworthy*) January, 1906: Province of Benguet, Bued River (4309 *Merrill*) November, 1905: Province of Zambales, Subic (*Hallier*) December, 1903: Province of Nueva Viscaya, Quiangan (125 *Merrill*) June, 1902. Province of Bataan, Lamao (1021 *Whitford*) December, 1904. CULION (486, 489 *Merrill*) December, 1902. PANAY, Iloilo (*Copeland*) January, 1904. PALAWAN, Puerto Princesa (208 *Bermejos*) December, 1905. MINDANAO, Lake Lanao, Camp Keithley (150, 631 *Clemens*) February, July, 1906. PALMAS (5364 *Merrill*) October, 1906.

Tropical regions of both hemispheres.

Var. **lasiorhachis** Hack. in Govt. Lab. Publ. **35** (1905) 81. *Oplismenus burmannii* Mez in Perk. Frag. Fl. Philip. (1904) 144, non Beauv.

PALAWAN (Paragua) Point Separation (826 *Merrill*) February, 1903.

Endemic.

(3) **Oplismenus undulatifolius** (Ard.) Beauv. Agrost. (1812) 54; Kunth Enum. **1** (1833) 139; Hook. f. Fl. Brit. Ind. **7** (1897) 66; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 338; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 28. *Panicum undulatifolium* Arduin. Animad. Bot. Spec. Alter. (1764) 14. *t. 4*.

LUZON, Province of Bataan, Mount Mariveles (2547 *Borden*) February, 1905; (6987 *Elmer*) November, 1904. MINDANAO, Province of Zamboanga (5485 *Merrill*) October, 1906.

Southern Europe to tropical Africa, India, China and Japan.

Var. **imbecillis** (R. Br.) Hack. in Govt. Lab. Publ. **25** (1905) 82; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 28. *Panicum imbecillis* Trin. Ic. (1828–36) 16. *t. 191*. *Orthopogon imbecillis* R. Br. Prodr. (1810) 194. *Oplismenus minus* Merr. Govt. Lab. Publ. **17** (1904) 9.

LUZON, Province of Bataan, Mount Mariveles (3203 *Merrill*) October, 1903: District of Lepanto, Mount Data (4511 *Merrill*) November, 1905. MINDANAO, Mount Apo (1136 *Copeland*) April, 1904.

Malaya and Australia.

(32) **SETARIA** Beauv.

Spikelets one to two flowered, ovate, in usually dense, cylindrical spike-like panicles, each spikelet subtended by one to many scabrous bristles which exceed the spikelets in length.

Species about 35, tropical and temperate regions of the World; 4 in the Philippines.

1. Inflorescence a dense, cylindrical spike-like panicle.
    2. Setæ few, 1 to 3, at the base of each spikelet.
        3. Inflorescence 5 to 7 cm. long, 1 cm. thick or less; setæ green .... (3) *S. viridis*
        3. Inflorescence 5 to 20 cm. long, 1 to 3 cm. thick; setæ usually purplish .... (1) *S. italica*
    2. Setæ many at the base of each spikelet, yellow or purplish .... (2) *S. flava*
1. Inflorescence a lax, open, subpyramidal, few-flowered panicle; setæ 1 at the base of each spikelet.................... (4) *S. laxa*

(1) **Setaria italica** (Linn.) Beauv. Agrost. (1812) 51; Kunth Enum. **1** (1833) 153; Hook. f. Fl. Brit. Ind. **7** (1897) 78; Llanos Frag. Pl. Filip. (1851) 24; Miq. Fl. Ind. Bat. **3** (1859) 467; F.-Vill. Nov. App. (1883) 312; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 180; Mez in Perk. Frag. Fl. Philip. (1904) 145; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 325. *Panicum italicum* Linn. Sp. Pl. (1753) 56. *P. miliaceum* Blanco Fl. Filip. ed. 1 (1837) 39; ed. 2, (1845) 28, non Linn. *Chaetochloa italica* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. **4** (1897) 39; Scribn. & Merr. l. c. **21** (1900) 20. *Setaria comosa* Miq. Fl. Ind. Bat. **3** (1859) 468. *Panicum comosum* Steud. Syn. **1** (1855) 53.

LUZON, Province of Rizal, Montalban (3410 *Ahern's collector*) November, 1905. NEGROS, Tanhay (*Jose Muñoz*) 1904. CULION (491 *Merrill*) December, 1902. BALABAC (500 *Mangubat*) March, 1906. Cultivated only. T., *Daua, Dava.* I., *Bucacao.*

Cultivated in most tropical and temperate regions.

(2) **Setaria flava** (Nees) Kunth Rev. Gram. **1** (1829) 46; Enum. **1** (1833) 149; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 28. *S. glauca* F.-Vill. Nov. App. (1883) 312; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 288; Ceron Cat. Pl. Herb. (1892) 180; Mez in Perk. Frag. Fl. Philip. (1904) 145, non Beauv. *Panicum flavum* Nees in Mart. Fl. Bras. **2** (1829) 180; *Panicum penicillatum* Willd.; Nees in Nov. Act. Nat. Cur. **19** (1834) Suppl. **1**: 173. *Panicum rubiginosum* Steud. Syn. **1** (1855) 50. *Setaria rubiginosa* Miq. Fl. Ind. Bat. **3** (1859) 467; F.-Vill. Nov. App. (1883) 313. *Panicum chrysanthum* Steud. Nom. ed. 2, **2** (1841) 254. *Chaetochloa flava* Scribn. U. S. Dept. Agr. Div. Agrost. Bull. **4** (1897) 39. *C. glauca* var. *aurea* Wight in Contr. U. S. Nat. Herb. **9** (1905) 223. *Setaria glauca* var. *aurea* K. Sch. Fl. Deutsch. Schutzegeb. Südsee (1901) 180. *S. aurea* Hochst. ex A. Br. in Flora **24** (1841) 276. *S. glauca* Hook. f. Fl. Brit. Ind. **7** (1897) 78 pro parte.

PHILIPPINES (551, 1342 *Cuming*). LUZON, Province of Benguet (4355, 4694 *Merrill*) October, November, 1905; (4869 *Curran*) August, 1906: Province of Nueva Ecija, Carranglang (208 *Merrill*) May, 1902: Province of Nueva Viscaya, Quiangan (113 *Merrill*) June, 1902: Province of Bataan, Lamao (1936 *Borden*) October, 1904: Province of Tarlac, Concepcion (3630 *Merrill*) November, 1903: Province of Principe, Baler (1140 *Merrill*) October, 1902: Province of Rizal, Morong (1446 *Ramos*) August, 1906; Bosoboso (1105 *Ramos*) July, 1906. SEME-

RARA (4141 *Merrill*) July, 1905. MINDANAO, Davao (546 *Copeland*) March, 1904; (100 *DeVore & Hoover*) April, 1903.

Tropics of both hemispheres.

Perhaps only a variety of *Setaria glauca*, distinguished from the typical state of that species, especially in the decidedly smaller spikelets.

(3) **Setaria viridis** (Linn.) Beauv. Agrost. (1812) 51; Kunth Enum. **1** (1833) 151; Miq. Fl. Ind. Bat. **3** (1859) 467; F.-Vill. Nov. App. (1883) 312; Hook. f. Fl. Brit. Ind. **7** (1897) 80; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 336.

LUZON, Manila (*Merrill*) July, 1905. A single specimen found along a city street, introduced.

(4) **Setaria laxa** Merrill, sp. nov.

Culmis debilibus, erectis, glabris, ramosis, at 1 m. altis; vaginis quam internodiis multo brevioribus, glabris vel sparse pilosis, margine sursum ciliato-pilosis; laminis linearibus vel anguste-lanceolatis, membranaceis, 7–16 cm. longis; paniculis laxis, elongato-pyramidatis, ad 20 cm. longis, paucifloris, ramis ramulisque interdum pedicellis in setam productis, seta scabra, 2–4 mm. longa; spiculis paucis, solitariis vel binis, glabris, 2–2.2 mm. longis.

A slender, erect branched, nearly glabrous grass about 1 m. high, the culms 1.5 to 2 mm. thick, glabrous; nodes glabrous. Sheaths much shorter than the internodes, glabrous or slightly pilose, the margins above ciliate-pilose; ligule ciliate; blades linear or narrowly lanceolate, membranaceous, acuminate, 7 to 16 cm. long, 3 to 5 mm. wide, glabrous or beneath along the nerves with few long white hairs, the margins and nerves scabrous. Panicles lax, elongate or elongate-pyramidal, erect, about 20 cm. long, the branches slender, erect-spreading, about 8 cm. long, few-flowered, scabrous, the branches, branchlets, and sometimes the pedicels produced into a 2 to 4 mm. long scabrous awn. Spikelets few, purplish, solitary or in pairs, glabrous, narrowly ovate, acute, 2 to 2.2 mm. long, the first glume 3-nerved, ovate, acute, 0.6 mm. long; second glume 5-nerved, ovate, acute, 1.4 mm. long; third glume 5-nerved, 2 mm. long; flowering glume 2 mm. long, narrowly ovate, acute, minutely rugose.

LUZON, Province of Laguna, Los Baños (*Hallier*) December, 1903.

A species characterized by its lax habit and panicle, narrow leaves, and comparatively few spikelets. The panicle branches are slender and branched from the base, usually solitary, alternate. Perhaps as near *Panicum* § *Ptycophyllum* as *Setaria*, but the narrow leaves are not at all plicate and the pedicels usually, but not always, end in a single bristle subtending the spikelet. No. 21157 β *Koorders* from Java is very nearly the same, but in that specimen the leaves are tuberculate hispid or pilose.

DOUBTFUL AND EXCLUDED SPECIES.

SETARIA MACROSTACHYA H. B. K.; F.-Vill. Nov. App. (1883) 312.

An American species to which some Australian specimens have been referred. Not to be expected in the Philippines.

SETARIA VERTICILLATA Beauv.; F.-Vill. Nov. App. (1883) 312. F.-Villar's record of this as a Philippine species has not been verified. To be expected in the Philippines. Tropical and temperate regions of the World.

SETARIA PILIFERA Llanos Frag. Pl. Filip. (1851) 34. Reduced by F.-Villar to *Panicum helopus* Trin., a species not known from the Philippines. Not satisfactorily determinable from the imperfect description.

SETARIA GLOBULARIS Presl Rel. Haenk. **1** (1830) 312; Kunth Enum. **1** (1833) 151; Miq. Fl. Ind. Bat. **3** (1859) 467; F.-Vill. Nov. App. (1883) 312; Scribn. Rept. Mo. Bot. Gard. **10** (1899) 52.

"Hab. in insulis Philippines" Presl. Scribner states that the sheet labeled by Presl, now in the Bernhardi herbarium at the Missouri Botanical Garden, contains three species, one being *Setaria caudata* Lam., one *S. composita* Kunth, and one undeterminable. As the first two species are tropical American, it seems probable that Presl credited the species to the Philippines through error, and that *Setaria globularis* Presl is a synonym of one of the above species, and not a Philippine plant.

(33) **AXONOPUS** Beauv.

Spikelets in whorled or digitate spikes, awned, the third glume with a small cleft palea.

Species 2 or 3, Tropical Asia, Malaya and Australia; 1 in the Philippines.

(1) **Axonopus semialatus** (R. Br.) Hook. f. Fl. Brit. Ind. **7** (1897) 64; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 334. *Panicum semialatum* R. Br. Prodr. (1810) 192; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 287; Ceron Cat. Pl. Herb. (1892) 180. *Urochloa semialata* Kunth Rev. Gram. **1** (1829) 31; Enum. **1** (1833) 74; Mez in Perk. Frag. Fl. Philip. (1904) 144. *Panicum philippicum* F.-Vill. Nov. App. (1883) 312. *Holosetum philippicum* Steud. Syn. **1** (1855) 118; Miq. Fl. Ind. Bat. **3** (1859) 444. *Alloteropsis distachya* Presl Rel. Haenk. **1** (1830) 344. *t. 47;* Kunth Enum. **1** (1833) 518; Scribn. in Rept. Mo. Bot. Gard. **10** (1899) 37. *pl. 23. Arundinella nervosa* Nees in Steud. Syn. **1** (1855) 115; Miq. Fl. Ind. Bat. **3** (1859) 519, var. *β*.

PHILIPPINES (1363, 1414 *Cuming*). LUZON, Manila (*Scribner*) June, 1902: Province of Benguet, Twin Peaks (6391 *Elmer*) May, 1904: Province of Nueva Ecija, Carranglang (213 *Merrill*) May, 1902: Province of Nueva Viscaya, Bagabag (119 *Merrill*) June, 1902.

Africa and Mauritius to southern Asia, Malaya, and Australia.

Hooker f.[13] states that the genus *Urochloa* Beauv., was based on *Panicum javanicum,* and I have accordingly followed him in accepting the generic name *Axonopus*.

(34) **CENCHRUS** Linn.

Spikelets narrow, one or two to three together enclosed by an indurated spiny involucre, these involucres disposed in cylindrical spike or raceme.

Species about 12, tropical and subtropical regions of both hemispheres, extending into the temperate regions in North America; 1 (introduced) in the Philippines.

(1) **Cenchrus echinatus** Linn. Sp. Pl. (1753) 1050; Kunth Enum. **1** (1833) 166; Presl Rel. Haenk. **1** (1830) 317; Miq. Fl. Ind. Bat. **3** (1859) 472; F.-Vill. Nov. App. (1883) 313; Ceron Cat. Pl. Herb. (1892) 181; Mez in Perk. Frag. Fl. Philip. (1904) 145; Usteri Beitr. Kenn. Philip. Veg. (1905) 132.

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[13] Fl. Brit. Ind., **7** (1897), 64.

LUZON, Manila (83, 366 *Merrill*) May, July, 1902; (34, 59 *McGregor*) October, 1904: Province of Cavite, Cavite (162 *Foxworthy*) July, 1905. PANAY (*Copeland*) January, 1904. CULION (493 *Merrill*) December, 1902.

Introduced from tropical America.

(35) PENNISETUM Pers.

Spikelets in racemes, spikes or false spikes, narrow or ovate, single or in groups of twos or threes surrounded by many slender, dissimilar bristles, the first glume usually minute, sometimes obsolete.

Species about 40, mostly of tropical and subtropical Africa; 1 in southern Europe; a few in tropical Asia and America; 2 in the Philippines.

1. Slender, 0.7 m. high or less; leaves slender, convolute................ (1) *P. compressum*
1. Robust, 1.5 to 2 m. high; leaves flat, broad.................................... (2) *P. macrostachyum*

(1) **Pennisetum compressum** R. Br. Prodr. (1810) 195; Hook. f. Fl. Brit. Ind. **7** (1897) 85; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 338. *Gymnothrix nigricans* Presl Rel. Haenk. **1** (1830) 315; Kunth Enum. **1** (1833) 159. *Pennisetum nigricans* Trin. ex Steud. Nomen. ed. 2, **2** (1841) 297; Miq. Fl. Ind. Bat. **3** (1859) 470; F.-Vill. Nov. App. (1883) 313. *P. cenchroides* F.-Vill. Nov. App. (1883) 313, non Spreng.? *Cenchrus hexaflorus* Blanco Fl. Filip. ed. 1 (1837) 36; ed. 2 (1845) 24.

LUZON, Province of Benguet, Baguio (5756 *Elmer*) March, 1904; Kabayan (4435 *Merrill*) October, 1905.

Burma to Tonkin, southern China, Japan, and Australia.

Cenchrus hexaflorus Blanco was previously considered by the author[14] to be a synonym of *Pennisetum macrostachyum* Trin., but Blanco's description applies much closer to *P. compressum* R. Br.

(2) **Pennisetum macrostachyum** Trin. in Mém. Acad. St. Pétersb. VI. 3^2 (1835) 177; Ceron Cat. Pl. Herb. (1892) 181; Schum. and Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 181. *Sericura elegans* Hassk. in Flora **25** (1842) Beibl. 2.

LUZON, Province of Tayabas, Atimonan (716 *Whitford*) August, 1904. MASBATE (3381 *Merrill*) November, 1903. MINDANAO, Lake Lanao, Camp Keithley (499 *Clemens*) April, 1906; Mount Malindang (4715 *Mearns & Hutchinson*) May, 1906.

Java to New Guinea and Polynesia.

(36) CHAMAERAPHIS R. Br.

Spikelets few on the branches of a simple panicle, the branchlets produced beyond the terminal spikelet as an awn-like bristle, the pedicels falling with the spikelets, the first empty glume very short. Postrate aquatic grasses.

Species about 5, tropical Asia, Malaya, Australia, and America; 1 in the Philippines.

(1) **Chamaeraphis aspera** (Koen.) Nees in Wall. Cat. (1828) No. 8679; Mez in Perk. Frag. Fl. Philip. (1904) 145. *Panicum asperum* Koen. in Naturf. **23** (1788) 209. *P. spinescens* R. Br. Prodr. (1810) 193; Kunth Enum. **1** (1833) 209. *Chamaeraphis spinescens* Poir. in Lam. Encycl. Suppl. **2**: 189; F.-Vill. Nov.

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[14] *Publications of the Bureau of Government Laboratories*, Manila (1905), No. **27**, 91.

App. (1883) 313; Hook. f. Fl. Brit. Ind. **7** (1897) 62; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 339.

LUZON, Manila (375 *Merrill*) August, 1902: Province of Nueva Ecija, San Isidro (4194 *Merrill*) September, 1905.

British India to southern China, Malaya, and Australia.

(*Stenotaphrum complanatum* Schrank=*S. glabrum* Trin., has been reported from the Philippines by F.-Villar, Nov. App. (1883) 313, but his record has never been verified. The species is widely distributed in the Tropics and is to be expected in the Philippines.)

(37) THUAREA Pers.

Spikes surrounded by a sheathing leaf, at maturity the dilated base of the axis enveloping the one to two perfect spikelets, forming a beak which bores into the ground. A creeping maritime grass.

A monotypic genus extending from Ceylon to New Caledonia.

(1) **Thuarea involuta** (Forst.) R. Br. Prodr. (1810) 197. *Ischaemum involutum* Forst. Prodr. (1786) 73. *Thuarea sarmentosa* Pers. Syn. **1** (1805) 110; Kunth Rev. Gram. **1** (1829) 247. *t. 35;* Enum. **1** (1833) 174; F.-Vill. Nov. App. (1883) 313; Usteri Beitr. Kenn. Philip. Veg. (1905) 133; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 28; Hook. f. Fl. Brit. Ind. **7** (1897) 91.

MINDORO, Baco (882 *Merrill*) April, 1903. CAJOAGAN (5244 *Merrill*) October, 1906. MINDANAO, Province of Zamboanga (*Scribner*) June, 1903; (*Hallier*) February, 1904: District of Davao (564 *Copeland*) March, 1904. PAMAS (5356 *Merrill*) October, 1906.

Seacoast from Ceylon to Madagascar, Malaya, Australia, and Polynesia.

(38) SPINIFEX Linn.

Coarse prostrate maritime grasses, the staminate spikelets in rigid peduncled spikes which are umbellately disposed. Pistillate spikelets in large globose heads of stellately spreading very long rod-like rhachides.

Species 4, 3 Australian, 1 widely distributed in tropical Asia, Malaya, Australia, and the Philippines.

(1) **Spinifex squarrosus** Linn. Mant. **2** (1771) 163; Blanco, Fl. Filip. ed. 1 (1837) 46; ed. 2 (1845) 31; ed. 3, **1** (1877) 57; Miq. Fl. Ind. Bat. **3** (1859) 474; F.-Vill. Nov. App. (1883) 313; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 288; Mez in Perk. Frag. Fl. Philip. (1904) 145; Hook. f. Fl. Brit. Ind. **7** (1897) 63. *Stipa spinifex* Linn. Mant. **1** (1867) 84; Blanco ll. cc.

LUZON, Province of Union, Bauang (5651 *Elmer*) February, 1904: Province of Zambales, Iba (333 *Merrill*) June, 1902: Province of Bataan, Lamao (*Whitford*) April, 1904. APO (Mindoro Straits) (419 *Merrill*) December, 1902. MINDANAO, Davao (511 *Copeland*) March, 1904; (154 *DeVore & Hoover*) April, 1903.

Tropical seashores from British India to southern China and Malaya.

Tribe VI. ORYZEÆ.

Spikelets perfect or unisexual, one-flowered, the flower enclosed by a flowering glume and palea which is usually 1-nerved. Empty glumes two or none. Stamens frequently 6.

(39) LEPTASPIS R. Br.

Staminate spikelets small, terminal on short branchlets; pistillate flowers 1 to 2, sessile on the lower portion of the same branches, large, globose, with two short empty glumes. Leaves large, broad, pedicellate.

Species 5 in the tropics of the Old World; 2 or 3 in the Philippines.

1. Leaves oblong to oblong-oblanceolate........ (1) *L. urceolata*
1. Leaves lanceolate........ (2) *L. cumingii*

(1) **Leptaspis urceolata** (Roxb.) R. Br. in Benn. Pl. Jav. Rar. (1838–1852) 23. *t. 6;* Miq. Fl. Ind. Bat. **3** (1859) 374; Steud. Syn. **1** (1855) 106; F.-Vill. Nov. App. (1883) 318; Vidal Rev. Pl. Vasc. Filip. (1886) 288; Phan. Cuming. Philip. (1885) 157. *L. manillensis* Steud. Syn. **1** (1855) 8; Miq. Fl. Ind. Bat. **3** (1859) 374; F.-Vill. Nov. App. (1883) 318. *Pharus urceolatus* Roxb. Fl. Ind. **3** (1832) 611.

MINDANAO, Davao (702 *Copeland*) March, 1904; Catalonan (*Copeland*) April, 1902: Lake Lanao, Camp Keithley (614 *Clemens*) June, 1906.

Malayan Peninsula and Archipelago to New Guinea.

(2) **Leptaspis cumingii** Steud. Syn. **1** (1855) 416; Miq. Fl. Ind. Bat. **3** (1859) 375; F.-Vill. Nov. App. (1883) 318; Vidal. Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 288.

PHILIPPINES (1627 *Cuming*). Not seen.

Endemic.

(3) **Leptaspis** sp. *L. cochleata* Thw.? Hack. in Govt. Lab. Publ. **35** (1905) 81.

MINDANAO, Davao (703 *Copeland*) March, 1904. Material too imperfect for satisfactory identification.

(40) ORYZA Linn.

Spikelets elongated; empty glumes of two small scales or bristles, and underneath these, two more minute rudimentary empty glumes. Flowering glume complicate and keeled, usually awned. Stamens 6.

Species about 6, in the Tropics of both hemispheres; 2 in the Philippines, 1, with many forms and varieties, cultivated (rice).

1. Spikelets paniculate; cultivated only........ (1) *O. sativa*
1. Spikelets in a simple raceme; a sylvan species........ (2) *O. meyeriana*

(1) **Oryza sativa** Linn. Sp. Pl. (1753) 333; Kunth Enum. **1** (1833) 7; Miq. Fl. Ind. Bat. **3** (1859) 368; F.-Vill. Nov. App. (1883) 318; Pilger in Perk. Frag. Fl. Philip. (1904) 145; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 28; Blanco Fl. Filip. ed. 1 (1837) 273; ed. 2 (1845) 190 et varr. *binamban, glutinosa, lamuyo, pilosa, praecox, quinanda, rubra* et *violacea* Blanco ll. cc. *O. aristata* Blanco ll. cc. 274, 190. *O. latifolia* Desv.; F.-Vill. Nov. App. (1883) 319. *O. glutinosa, montana* et *praecox* Lour. Fl. Cochinch. (1790) 215; F.-Vill. Nov. App. (1883) 319. *O. minuta* Presl Rel. Haenk. **1** (1830) 208; Kunth Enum. **1** (1833) 7; Miq. Fl. Ind. Bat. **3** (1859) 371; F.-Vill. Nov. App. (1883) 319, ex descr.

Tropical Asia, but generally cultivated in tropical and warm countries of the World. Common rice, widely cultivated in the Philippines, with very numerous cultural varieties.

(2) **Oryza meyeriana** (Zoll. et Mor.) Baill. Hist. Pl. **12** (1894) 166; Pilger in Perk. Frag. Fl. Philip. (1904) 145. *Padia meyeriana* Zoll. et Mor. Verz. Ind. Archip. (1854–55) 103; Steud. Syn. **1** (1855) 3; Miq. Fl. Ind. Bat. **3** (1859)

373. *Oryza granulata* Nees et Arn. in Wight. Cat. No. 2354; Hook. f. Fl. Brit. Ind. **7** (1897) 93; Merr. in Govt. Lab. Publ. **6** (1904) 7.

LUZON, Province of Nueva Viscaya, Quiangan (116 *Merrill*) June, 1902. PALAWAN, Puerto Princesa (343 *Bermejos*) January, 1906.

Himalayan region to Java and Celebes.

(41) LEERSIA Sw.

Distinguished from *Oryza* by the aborted empty glumes and awnless flowering glume. Stamens one to three or in our species six.

Species 5, tropical and temperate regions of the World; 1 in the Philippines.

(1) **Leersia hexandra** Sw. Prodr. Veg. Ind. Occ. (1788) 21; Kunth Enum. **1** (1833) 94; Llanos Frag. Pl. Filip. (1851) 26; F.-Vill. Nov. App. (1883) 318; Vidal Phan. Cuming. Philip. (1885) 157; Rev. Pl. Vasc. Filip. (1886) 288; Ceron Cat. Pl. Herb. (1892) 181; Hook. f. Fl. Brit. Ind. **7** (1897) 94; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 345; Pilger in Perk. Frag. Fl. Philip. (1904) 145; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 28. *L. glaberrima* Trin.; Miq. Fl. Ind. Bat. **3** (1859) 367; F.-Vill. Nov. App. (1883) 318. *Hemalocenchrus hexandrus* O. Ktze. Rev. Gen. Pl. (1891) 777. *Leersia luzonensis* Presl, Rel. Haenk. **1** (1830) 207.

PHILIPPINES (529 *Cuming*). LUZON, Manila (41, 381 *Merrill*) May, August, 1902: Province of Benguet, Baguio (4337 *Merrill*) November, 1905. Province of Bataan, Lamao (*Whitford*) September, 1905. MINDANAO, Lake Lanao, Camp Keithley (394 *Clemens*) March, 1906.

The most commonly cultivated forage grass in the Philippines. Sp.-Fil., *Zacáte*. T., *Barít*.

Tropical Africa, Asia, Malaya, Australia, and America.

Tribe VII. PHALARIDEÆ.

All the spikelets fertile, one-flowered with one to two staminate flowers inserted below the apparently terminal one. Empty glumes four, unequal, the third and fourth occasionally very small, or one of them rudimentary. Flowering glume and palea alike, laterally compressed, awnless, nerves one or wanting.

(42) MICROLAENA R. Br.

First and second glumes very short, the third and fourth longer than the flowering glume, all keeled. Inflorescence paniculate.

Species 5 confined to Australia and New Zealand with the exception of the following, which extends to Luzon.

(1) **Microlaena stipoides** (Labill.) R. Br. Prodr. (1810) 210; Benth. Fl. Austral. **7** (1878) 552; Kunth Enum. **1** (1833) 16; Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 269. *Ehrharta stipoides* Labill. Pl. Nov. Holl. **1** (1804) 91. *t. 118.*

LUZON, Province of Benguet, Mount Tonglong (4831 *Merrill*) November, 1905; Pauai to Baguio (4696 *Merrill*) November, 1905: District of Lepanto, Mount Data (4543 *Merrill*) November, 1905.

Australia and New Zealand.

(43) **ANTHOXANTHUM** Linn.

Spikelets in short spike-like panicles; first and second glumes unequal, herbaceous, the third and fourth clothed with brown hairs. Flowering glume and palea short, membranous. Fragrant grasses.

Species 5 of the North Temperate Zone and Australia; 1 in northern Luzon.

(1) **Anthoxanthum luzoniense** Merr. Philip. Journ. Sci. **1** (1906) Suppl. 178.

LUZON, Province of Benguet, Pauai (4713 *Merrill*) November, 1905.

Endemic.

Tribe VIII. **AGROSTIDEÆ.**

Spikelets usually all perfect, 1-flowered, the rhachilla sometimes prolonged beyond the palea. Empty glumes often somewhat unequal, usually equaling or exceeding the flowering glume. Palea usually 2-nerved.

(44) **ARISTIDA** Linn.

Panicles usually expanded. Empty glumes longer than the flowering glume, the latter with a pointed callus and with a terminal trifid or three-branched awn.

Species about 125, in the warmer parts of both hemispheres; 3 or more in the Philippines.

1. A slender annual 20 cm. high or less.. (1) *A. cumingiana*
1. Perennial.
    2. Stout, 1 m. high with large diffuse many-flowered panicles.... (2) *A. culionensis*
    2. About 40 cm. high; panicles narrow, few-flowered................. (3) *A. stipoides*

(1) **Aristida cumingiana** Trin. & Rupr. in Mém. Acad. St. Pétersb. VI. **7** (1849) 141; Miq. Fl. Ind. Bat. **3** (1859) 381; Steud. Syn. **1** (1855) 140; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 292; Ceron Cat. Pl. Herb. (1892) 184; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 381; Hook. f. Fl. Brit. Ind. **7** (1897) 224. *A. capillacea* Cav. Icon. **5** (1799) 43, *t. 468. f. 1,* non Lam. *A. trichodes* Walp. Ann. **3** (1852–53) 753. *Chaetaria trichodes* Nees in Hook. Kew Journ. **2** (1850) 1001.

LUZON, Province of Benguet, Ambuklao to Daklan (4385 *Merrill*) October, 1905: District of Lepanto, Suyoc to Cervantes (4446 *Merrill*) November, 1905: Province of Rizal, Antipolo (7 *Foxworthy*) January, 1906.

Northern India to southern China and the Philippines.

(2) **Aristida culionensis** Pilger in Perk. Frag. Fl. Philip. (1904) 145.

CULION (471, 515 *Merrill*) December, 1902.

Endemic.

(3) **Aristida stipoides** R. Br. Prodr. (1810) 174, var. **tenuisetulosa** Pilger in Perk. Frag. Fl. Philip. (1904) 146.

LUZON, Province of Zambales, Iba (329 *Merrill*) June, 1902.

Endemic, i. e., the variety, the species in northern and central Australia.

DOUBTFUL AND EXCLUDED SPECIES.

ARISTIDA SORZOGONENSIS Presl Rel. Haenk. **1** (1830) 224; Kunth Enum. **1** (1833) 192; Miq. Fl. Ind. Bat. **3** (1859) 381; F.-Vill. Nov. App. (1883) 319.

"Hab. in Luzonia ad Sorsogon" Presl. Not seen.

ARISTIDA LUZONIENSIS Cav. Icon. **5** (1799) 45. *t. 470. f. 2;* Kunth Enum. **1**

(1833) 192; Miq. Fl. Ind. Bat. **3** (1859) 381; F.-Vill. Nov. App. (1883) 319. *Chaetaria luzoniensis* Beauv. Agrost. (1812) 30.

"Habitat in insula Luzon altera ex Philippicis" Cavanilles. Not seen; perhaps not a Philippine plant.

Aristida laxa Cav. Icon. **5** (1799) 44. *t. 470. f. 1;* Kunth Enum. **1** (1833) 192; Miq. Fl. Ind. Bat. **3** (1859) 381; F.-Vill. Nov. App. (1883) 319.

"Habitat prope Montevideo, et in insulis Philippicis" Cavanilles. Not seen; apparently a South American species erroneously credited to the Philippines.

Aristida rigida Cav. Icon. **5** (1799) 44. *t. 469. f. 2;* Kunth Enum. **1** (1833) 192; Miq. Fl. Ind. Bat. **3** (1859) 381; F.-Vill. Nov. App. 319.

"Habitat in insulis Philippicis" Cavanilles. Not seen.

Aristida murina Cav. Icon. **1** (1799) 44. *t. 469. f. 1;* Kunth Enum. **1** (1833) 192; F.-Vill. Nov. App. (1883) 319.

"Habitat in Mindanao insula prope Samboangan" Cavanilles.

Apparently not a Philippine plant; credited to South America in Index Kewensis.

Although the above four species described by Cavanilles are figured by him, I have seen no Philippine specimens that match his figures and descriptions. As it is probable that the specimens on which the species were based were not from the Philippines, I have enumerated them here as doubtful ones.

(45) SPOROBOLUS R. Br.

Panicles various. Spikelets small, awnless, naked; flowering glume and palea usually exceeding the empty glumes; palea bifid. Fruit a utricle, the expelled seed usually remaining adherent for a time to the spikelet.

Species about 100, chiefly in temperate and tropical America, but some species in Asia, Africa, Malaya, and Australia; about 3 in the Philippines.

1. Second and third glumes subequal, the first shorter; annual.................. (1) *S. piliferus*
1. First and second glumes much shorter than the third; perennial.
    2. Panicles narrowly pyramidal or elongated, the branches capillary, in scattered fascicles, rather lax.. (2) *S. diandrus*
    2. Panicles very narrow, spiciform, densely flowered, the branches short, appressed, covered to the base with crowded spikelets.. (3) *S. indicus*

(1) **Sporobolus piliferus** (Trin.) Kunth Enum. **1** (1833) 311, excl. var. β; Hook. f. Brit. Ind. **7** (1897) 251. *S. ciliata* Presl Rel. Haenk. **1** (1830) 242; Scribn. in Rept. Mo. Gard. **10** (1899) 53. *pl. 30;* Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 269. *Vilfa pilifera* Trin. Diss. (1824) 157; Sp. Gram. Icon. *t. 58.*

Luzon, Province of Benguet (4362, 4718 *Merrill*) October, November, 1905.

British India to Malacca and Central America.

(2) **Sporobolus diandrus** (Retz.) Beauv. Agrost. (1812) 26; Miq. Fl. Ind. Bat. **3** (1859) 375; F.-Vill. Nov. App. (1883) 321; Hook. f. Fl. Brit. Ind. **7** (1897) 247; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 387; Pilger in Perk. Frag. Fl. Philip. (1904) 146. *Agrostis diandra* Retz. Obs. **5** (1779–91) 19. *Vilfa diandra* Steud. Syn. **1** (1855) 155.

Luzon, Manila (92 *Merrill*) May, 1902: Province of Pampanga, Bacolor (45 *Parker*) May, 1904. Palawan (4168, 4169 *Curran*) May, 1906.

India to southern China and Malaya.

(3) **Sporobolus indicus** (Linn.) R. Br. Prodr. (1810) 170; Kunth Enum. **1** (1833) 211; F.-Vill. Nov. App. (1883) 321; Hook. f. Fl. Brit. Ind. **7** (1897) 247. *S. elongatus* R. Br. Prodr. (1810) 170; Usteri Beitr. Kenn. Philip. Veg. (1905) 133. *Agrostis indica* Linn. Sp. Pl. (1753) 63.

LUZON, Province of Isabela, Echague (139 *Merrill*) June, 1902: Province of Benguet, Baguio (6523, 5758 *Elmer*) March, June, 1904. MINDANAO, Lake Lanao, Camp Keithley (98 *Clemens*) January, 1906.

Tropics of the World.

DOUBTFUL SPECIES.

SPOROBOLUS HUMILIS Presl Rel. Haenk. **1** (1830) 241; Kunth Enum. **1** (1833) 217; Miq. Fl. Ind. Bat. **3** (1859) 376; F.-Vill. Nov. App. (1883) 321; Scribn. in Rept. Mo. Bot. Gard. **10** (1899) 53. *pl. 30.*

"Hab. in insula Luzonia" Presl.

Perhaps not a Philippine plant, or possibly a much-dwarfed form of *Sporobolus diandrus* Beauv. Scribner, who has examined Haenke's specimen on which the species was based, makes no statement regarding the validity or relationship of the species.

SPOROBOLUS SCOPARIUS Presl Rel. Haenk. **1** (1830) 243; Kunth Enum. **1** (1833) 216; Miq. Fl. Ind. Bat. **3** (1859) 376; F.-Vill. Nov. App. (1883) 321.

"Hab. ad portum Sorzogon" (Luzon) Presl.

Judging from the description, a very characteristic species. I have seen no Philippine material that agrees with it. Perhaps not a Philippine plant.

(46) GARNOTIA Brongn.

Spikelets small, in pairs along the branches of the strict or expanded panicle. Flowering glumes with slender awns or awnless.

Species 8, British India to Japan, Malaya, and the Sandwich Islands; 1 in the Philippines.

(1) **Garnotia stricta** Brongn. in Duperry Bot. Voy. Coqu. (1829) 132. *t. 21;* Hook. f. Fl. Brit. Ind. **7** (1897) 243; Merr. Philip. Journ. Sci. **1** (1906) Suppl. 28.

LUZON, Province of Benguet (6210 *Elmer*) April, 1904; (4716 *Merrill*) November, 1905: Province of Bataan, Mount Mariveles (6989 *Elmer*) November, 1904; (1146 *Whitford*) March, 1905: Province of Pampanga, Mount Arayat (3903 *Merrill*) October, 1904. MINDANAO, Province of Zamboanga (5484 *Merrill*) October, 1906.

British India to the Sandwich Islands.

The Philippine form may represent a distinct species, characterized especially by the long-awned flowering glume.

(47) GARNOTIELLA Stapf.

A slender grass with narrow strict panicles. Spikelets small, solitary; empty glumes two, nerveless, subequal; flowering glume minute, hyaline, the palea a small, hyaline nerveless scale.

A monotypic endemic genus.

(1) **Garnotiella philippinensis** Stapf in Hook. Icon. Pl. IV. **5** (1896) *pl. 2494.*

PANAY, Miagao (3994 *Vidal*) fide Stapf l. c.

Endemic.

(48) AGROSTIS Linn.

Panicles diffuse, many flowered. Spikelets small; flowering glumes thin-membranous or hyaline, awnless (in the Philippine representative), equaling or smaller than the empty glumes.

Species about 120, distributed over the entire globe, especially in the north temperate regions; 1 in the Philippines.

(1) **Agrostis elmeri** Merr. in Govt. Lab. Publ. **29** (1905) 7.

LUZON, Province of Benguet, Mount Tonglong (Santo Tomas) (6558 *Elmer*) June, 1904; (4812 *Merrill*) November, 1905; Pauai (4711, 4728 *Merrill*) November, 1905: District of Lepanto, Mount Data (4538, 4542 *Merrill*). November, 1905.

Endemic.

(49) CALAMAGROSTIS Roth.

Panicles open or spike-like, many flowered. Hairs on the callus of the flowering glume sometimes short, sometimes longer than the glume itself, which is thin-membranous and awned from the middle or below. Rhachilla elongated, pilose.

Species about 140, in the temperate and arctic regions of both hemispheres and on the mountains in the Tropics; 2 in the Philippines.

1. Panicle dense, spiciform........ (2) *C. filifolia*
1. Panicle rather lax, open........ (1) *C. arundinacea*

(1) **Calamagrostis arundinacea** Roth, var. **nipponica** (Fr. et Sav.) Hack. in Bull. Herb. Boiss **7** (1899) 652; Philip. Journ. Sci. **1** (1906) Suppl. 269. *Calamagrostis nipponica* Fr. et Sav. Enum. Pl. Jap. **2** (1879) 599.

LUZON, District of Lepanto, Mount Data (4564 *Merrill*) November, 1905: Province of Benguet (4697, 4701 *Merrill*) November, 1905.

Japan, i. e., the variety, the species widely distributed in Japan and Asia.

2. **Calamagrostis filifolia** Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 179.

LUZON, Province of Benguet, Mount Tonglong (4839 *Merrill*) November, 1905; Pauai (4715 *Merrill*) November, 1905: District of Lepanto, Mount Data (4537 *Merrill*) November, 1905.

Endemic.

(*Deyeuxia quadriseta* Benth., to which F.-Villar reduces *China filiformis* Llanos, Frag. Pl. Filip. (1851) 9, non Link., has been reported from the Philippines by F.-Villar, Nov. App. (1883) 319. As this species is known only from Australia and New Zealand, it is probable that the Philippine record was based on an erroneous identification on the part of F.-Villar.)

Tribe IX. AVENEÆ.

Spikelets 2 to many-flowered, inflorescence paniculate, all the flowers perfect or one staminate; empty glumes often persistene and longer than the flowering glumes, the latter usually awned from the back or from near the apex, the awns geniculate or straight.

(50) ERIACHNE R. Br.

Panicles loose or dense; empty glumes many-nerved; flowering glumes awnless or with fine terminal awns, finally somewhat indurated, the spikelets rather small.

Species about 25, 2 Asiatic and Malayan, the others Australian; 2 in the Philippines.

1. Third and fourth glumes and palea bicuspidate........ (1) *E. pallescens*
1. Third and fourth glumes and palea long-awned........ (2) *E. triseta*

(1) **Eriachne pallescens** R. Br. Prodr. (1810) 184; Kunth Enum. **1** (1833) 310; Benth Fl. Austral. **7** (1878) 630; F.-Vill. Nov. App. (1883) 321; Hook. f. Fl. Brit. Ind. **7** (1897) 269; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904). 398; Pilger in Perk. Fl. Philip. (1904) 147.

CULION (520 *Merrill*) December, 1902.

British India to southern China, Malaya, and Australia.

(2) **Eriachne triseta** Nees ex Steud. Syn. **1** (1855) 237; Hook. f. Fl. Brit. Ind. **7** (1897) 369; Pilger in Perk. Fl. Philip. (1904) 147.

CULION (*Merrill*) February, 1903.

British India and Ceylon.

(*Eriachne gracilis* Brong., a species definitely known only from the Moluccas, has been reported from the Philippines by F.-Villar, Nov. App. (1883) 321; but the record was doubtless based on an erroneous identification.)

(51) COELACHNE R. Br.

Very delicate, prostrate grasses with narrow panicles and small, round, awnless, 2-flowered spikelets.

Species about 4, by some authors reduced to 1 with numerous varieties, British India to southern China and Australia; 1 in the Philippines.

(1) **Coelachne hackeli** Merr. in Govt. Lab. Publ. **29** (1905) 8.

LUZON, Province of Benguet, Baguio (5752 *Elmer*) March, 1904; (4338 *Merrill*) November, 1905.

Endemic.

(*Coelachne brachiata* Munro=*C. pulchella* R. Br. var. *brachiata* Munro, and *C. pulchella* R. Br., have been reported from the Philippines by F.-Villar, Nov. App. (1883) 321, and one or both may later be found in the Archipelago, although to date F.-Villar's records have not been verified.)

(52) AVENA Linn.

Spikelets large, 2 to 6-flowered, paniculate. Empty glumes membranous, unequal; flowering glumes rounded on the back, 5 to 9-nerved, the awn dorsal, geniculate, twisted below. Callus of the flowering glumes and the rhachilla often hairy.

Species about 60, temperate regions of the Old World, a few in the New World; 1 or 2 introduced into the Philippines.

(1) **Avena sativa** Linn. Sp. Pl. (1753) 79; Hook. f. Fl. Brit. Ind. **7** (1897) 275.

LUZON, Province of Benguet (4284, 4747 *Merrill*) November, 1905, one cultivated, the other on fresh talus slopes near a road construction camp.

(*Avena sterilis* Linn., and *A. fatua* Linn., have been reported from the Philippines by F.-Villar, Nov. App. (1883) 319, but to date his records have not been verified. If either or both occur in the Philippines it will be as is the case with *Avena sativa*, only as introduced plants.)

Tribe X. CHLORIDEÆ.

Spikelets one to many-flowered, in two series upon the outer side of the continuous rhachis of the spike or raceme, these spikes or racemes digitately or paniculately disposed. Flowering glumes deciduous with the fruit, the empty glumes usually two and persistent.

(53) **CYNODON** Pers.

Spikelets small; flowering glumes usually longer and broader than the narrow empty ones, ciliate on the keel. Spikes slender, digitate, divergent.

Species 5, mostly Australian, 1 cosmopolitan in tropical and warm regions; 2 in the Philippines.

1. Flowering stems 20 cm. high or less; leaves 3 to 4 cm. long; spikes 3 to 4, 3 cm. long or less........ (1) *C. dactylon*
1. Flowering stems about 40 cm. high; leaves 7 to 9 cm. long; spikes 5 to 7, 8 to 10 cm. long........ (2) *C. arcuatus*

(1) **Cynodon dactylon** (Linn.) Pers. Syn. **1** (1804) 85; Kunth Enum. **1** (1833) 259; Miq. Fl. Ind. Bat. **3** (1859) 382; F.-Vill. Nov. App. (1883) 319; Vidal Phan. Cuming. Philip. (1859) 159; Rev. Pl. Vasc. Filip. (1886) 292; Hook. f. Fl. Brit. Ind. **7** (1897) 288; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 402; Mez in Perk. Frag. Fl. Philip. (1904) 174; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 28. *Panicum dactylon* Linn. Sp. Pl. (1753) 58. *Capriola dactylon* O. Kuntze Rev. Gen. Pl. (1891) 764. *Cynodon linearis* Willd. Enum. Hort. Berol. (1809) 90; Presl Rel. Haenk. **1** (1830) 290; Scribn. in Rept. Mo. Bot. Gard. **10** (1899) 41. *Panicum glumaepatulum* Steud. Syn. **1** (1855) 41. *P. glumaepetalum* F.-Vill. Nov. App. (1883) 312. *Digitaria glumaepatula* Miq. Fl. Ind. Bat. **3** (1859) 439.

PHILIPPINES (550 *Cuming*). LUZON, Manila (24 *Merrill*) April, 1902: Province of Benguet, Baguio (5772 *Elmer*) March, 1904: Province of Pampanga, Bacolor (20 *Parker*) May, 1904. PANAY, Iloilo (*Copeland*) January, 1904. MINDANAO, Davao (568 *Copeland*) March, 1904. Sp.-Fil., *Grama*.

Widely distributed in the warmer parts of the World.

(2) **Cynodon arcuatus** Presl Rel. Haenk. **1** (1830) 290; Kunth Enum. **1** (1833) 259; Miq. Fl. Ind. Bat. **3** (1859) 383; F.-Vill. Nov. App. (1883) 320; Scribn. in Rept. Mo. Bot. Gard. **10** (1899) 41. *pl. 40;* Merr. in Govt. Lab. Publ. **17** (1904) 9; Philip. Journ. Sci. **1** (1906) Suppl. 28.

LUZON, Province of Tarlac, Concepcion (3619 *Merrill*) November, 1903: Province of Bataan, Lamao (3171 *Merrill*) October, 1903: Province of Rizal, Morong (1392 *Ramos*) August, 1906.

Endemic.

(*Microchloa setacea* R. Br., has been reported from the Philippines by F.-Villar Nov. App. (1883) 319, but his record has not been verified. As the species is widely distributed in the tropics of both hemispheres, it is to be expected in the Philippines.)

(54) **CHLORIS** Sw.

Empty glumes narrow, very acute; flowering glumes usually 2-cleft, frequently ciliate, one to several empty glumes above the flowering glumes which are usually broadly truncate and often awned.

Species about 50, in all warm countries; 1 (or more?) in the Philippines.

(1) **Chloris barbata** (Linn.) Sw. Fl. Ind. Occ. **1** (1797) 200; Kunth Enum. **1** (1833) 264; Miq. Fl. Ind. Bat. **3** (1859) 387; F.-Vill. Nov. App. (1883) 320; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 292; Hook. f. Fl. Brit. Ind. **7** (1897) 292; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 403; Pilger in Perk. Frag. Fl. Philip. (1904) 147. *C. longifolia* Steud. Syn. **1** (1855) 205; Miq. Fl. Ind. Bat. **3** (1859) 388; F.-Vill. Nov. App. (1883) 320. *C. rhachitricha* Steud. l. c.?; Miq. l. c.; F.-Vill. l. c. *Eleusine mucronata* Llanos Frag. Pl. Filip. (1851) 45.

LUZON, Manila (33 *Merrill*) April, 1902; (7 *Topping*) July, 1902; (35 *McGregor*) October, 1904: Province of Cavite, Cavite (165 *Foxworthy*) July, 1905. PALAWAN, Puerto Princesa (4170, 4183 *Curran*) May, 1906.

Tropics generally.

DOUBTFUL AND EXCLUDED SPECIES.

CHLORIS CRINITA Lag. Varied. Cienc. **4** (1805) 143; Kunth Enum. **1** (1833) 268; Miq. Fl. Ind. Bat. **3** (1859) 389; F.-Vill. Nov. App. (1883) 320.

"Insulae Philippinae" Kunth. Apparently not a *Chloris,* and probably not a Philippine plant.

CHLORIS TRUNCATA R. Br. Prodr. (1810) 186; Kunth Enum. **1** (1833) 266; Miq. Fl. Ind. Bat. **3** (1859) 387; F.-Vill. Nov. App. (1883) 320. *Chloris dolichostachya* Lag. Gen. et Sp. Nov. (1816) 5.

Chloris dolichostachya Lag., is credited by that author to the Philippines, and was reduced to *C. truncata* R. Br. by Link. Lagasca's description is insufficient for accurate identification of his species. *Chloris truncata* R. Br., is an Australian species.

CHLORIS INFLATA Llanos Frag. Pl. Filip. (1851) non Link, reduced by F.-Villar to the preceding, but apparently an erroneous reduction.

CHLORIS RADIATA Sw.; F.-Vill. Nov. App. (1883) 320. Certainly an erroneous identification on the part of F.-Villar. A species of tropical America.

CHLORIS RUFESCENS Lag. Varied. Cienc. **4** (1805) 143; Kunth Enum. **1** (1833) 268; Miq. Fl. Ind. Bat. **3** (1859) 388; Llanos, Frag. Pl. Filip. (1851)?; F.-Vill. Nov. App. (1883) 320.

"Insulae Philippinae" Kunth. Possibly not a Philippine plant.

CHLORIS TENER (Presl) Scribn. Rept. Mo. Bot. Gard. **10** (1899) 41. *pl. 40.* *Cynodon tener* Presl Rel. Haenk. **1** (1830) 291; Kunth Enum. **1** (1833) 260; Miq. Fl. Ind. Bat. **3** (1859) 383; F.-Vill. Nov. App. (1883) 320.

"Hab. ad Sorzogon, Luzoniae" Presl. Apparently an American plant, erroneously localized by Presl. Scribner states that it is very close to an American species, *Chloris petraea* Sw. Possibly only a reduced form of that species.

(55) **ELEUSINE** Gaertn.

Spikes digitate, the spikelets many flowered, crowded. Glumes closely imbricate, diverging, compressed and keeled, obtuse or mucronate.

Species 6, mostly of the tropical and subtropical regions of the Old World, 1 cosmopolitan; 1 in the Philippines.

(1) **Eleusine indica** (Linn.) Gaertn. Fruct. **1** (1788) 8; Kunth Enum. **1** (1833) 273; Presl Rel. Haenk. **1** (1830) 286; Llanos Frag. Pl. Filip. (1851) 45; Miq. Fl. Ind. Bat. **3** (1859) 386; F.-Vill. Nov. App. (1883) 320; Vidal Phan. Cuming. Philip. (1885) 159; Ceron Cat. Pl. Herb. (1892) 184; Pilger in Perk. Frag. Fl. Philip. (1904) 147; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 29; Hook. f. Fl. Brit. Ind. **7** (1897) 293. *Cynosurus indicus* Linn. Sp. Pl. (1753) 72. *Eleusine barbata* Vid. Rev. Pl. Vasc. Filip. (1886) 292.

LUZON, Manila (42 *Merrill*) May, 1902; (30 *McGregor*) October, 1904: Province of Bataan, Dinalupijan (1567 *Merrill*) January, 1903; Lamao (800 *Borden*) May, 1904: Province of Cavite, Cavite (159 *Foxworthy*) July, 1905: Province of Pampanga, Bacolor (25 *Parker*) May, 1904: Province of Union, Bauang (5685 *Elmer*) February, 1904. MINDORO, Baco River (212 *McGregor*) April, 1905; Bongabong River (3619 *Merrill*) February, 1906. MINDANAO, Davao (259 *DeVore & Hoover*) April, 1903.

Tropics of the Old World, introduced into the New.

DOUBTFUL AND EXCLUDED SPECIES.

ELEUSINE COROCANA Gaertn. Fruct. **1** (1788) 8. *t. 1;* Hook. f. Fl. Brit. Ind. **7** (1897) 294; F.-Vill. Nov. App. (1883) 320.

Widely cultivated in British India and reported from the Philippines by F.-Villar. F.-Villar's record not verified.

ELEUSINE VERTICELLATA Roxb.; Hook. f. l. c. 295; F.-Vill. l. c. 320.

Reported from the Philippines by F.-Villar, but his record was probably based on a form of *Eleusine indica* Gaertn. Tropical Asia, Africa, and Australia.

ELEUSINE POLYDACTYLA Steud. Syn. **1** (1855) 211; Miq. Fl. Ind. Bat. **3** (1859) 386; F.-Vill. Nov. App. (1883) 320.

Based on No. 824 *Cuming* from the Philippines, according to Steudel. Index Kewensis, however, gives the locality as tropical Africa.

(56) DACTYLOCTENIUM Willd.

Empty glumes strongly mucronate-pointed; rhachis produced as a point beyond the upper spikelets, otherwise much as the preceeding genus.

Species 1 with several varieties, cosmopolitan in the tropical and warmer regions of the World.

(1) **Dactyloctenium aegyptiacum** (Linn.) Willd. Enum. Hort. Berol. (1809) 1029; Kunth Enum. **1** (1833) 261; Miq. Fl. Ind. Bat. **3** (1859) 384; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 406; Pilger in Perk. Frag. Fl. Philip. (1904) 147. *Eleusine aegyptiaca* Desf. Fl. Atl. **1** (1798–1800) 85; F.-Vill. Nov. App. (1883) 320; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 293; Hook. f. Fl. Brit. Ind. **7** (1897) 295. *Digitaria lanosa* Llanos Frag. Pl. Filip. (1851) 28.

LUZON, Manila (63 *Merrill*) May, 1902; (36 *McGregor*) October, 1904: Province of Cavite, Cavite (157 *Foxworthy*) July, 1905: Province of Bataan, Dinalupijan (1569 *Merrill*) January, 1903: Province of Principe, Baler (1127, 1136 *Merrill*) September, 1902: Province of Union, Bauang (5677 *Elmer*) February, 1904: Province of Rizal, Morong (1395 *Ramos*) August, 1906. PALAWAN, Puerto Princesa (4174, 4188 *Curran*) May, 1906. MINDANAO, Lake Lanao (*Clemens*) February, 1906; District of Davao (567 *Copeland*) March, 1904; (229 *DeVore & Hoover*) April, 1903.

Widely distributed in the Tropics of the Old World, introduced into the New.

(57) LEPTOCHLOA Beauv.

Inflorescence a panicle formed of numerous slender spikes. Spikelets small, two to many-flowered, rarely one-flowered, compressed, awnless.

Species about 12, warmer parts of both hemispheres, 2 in the Philippines.

1. Culms rather stout; spikelets 4 to 6-flowered.. (1) *L. chinensis*
1. Culms slender; spikelets 2 to 3-flowered.. (2) *L. filiformis*

(1) **Leptochloa chinensis** (Linn.) Nees in Syll. Ratisb. **1** (1824) 4; Steud. Syn. **1** (1855) 209; Miq. Fl. Ind. Bat. **3** (1859) 389; F.-Vill. Nov. App. (1883) 320; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 293; Hook. f. Fl. Brit. Ind. **7** (1897) 299; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 407; Pilger in Perk. Frag. Fl. Philip. (1904) 147. *L. tetraquetra* Presl Rel. Haenk. **1** (1830) 288; Miq. Fl. Ind. Bat. **3** (1859) 389; F.-Vill. Nov. App. (1883) 320, ex descr. *Poa chinensis* Linn. Sp. Pl. (1753) 69.

PHILIPPINES (825 *Cuming*). LUZON, Manila (9, 378 *Merrill*) April, August, 1902: Province of Pampanga, Bacolor (61 *Parker*) June, 1904: Province of Rizal, Morong (1400 *Ramos*) August, 1906.

British India to China, Japan, Malaya, and Australia.

(2) **Leptochloa filiformis** R. et S. Syst. **2** (1817) 580; Presl Rel. Haenk. **1** (1830) 288 (var. *humilior*); Miq. Fl. Ind. Bat. **3** (1859) 389; Kunth Enum. **1** (1833) 270; F.-Vill. Nov. App. (1883) 320; Hook. f. Fl. Brit. Ind. **7** (1897) 298; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 407; Usteri Beitr. Kenn. Philip. Veg. (1905) 133.

LUZON, Province of Union, Bauang (5682 *Elmer*) February, 1904. PALAWAN, Puerto Princesa (4175 *Curran*) May, 1906.

Tropical Asia, Africa, Malaya, and America.

EXCLUDED SPECIES OF CHLORIDEÆ.

Several species of *Bouteloua* have been erroneously credited to the Philippines by various authors, but the genus is exclusively American. The species erroneously credited to the Philippines are as follows:

BOUTELOUA CURTIPENDULA (Michx.) Torr.; *Eutriana curtipendula* Trin.; Miq. Fl. Ind. Bat. **3** (1859) 383; F.-Vill. Nov. App. (1883) 320.

BOUTELOUA BARBATA Lag.; *Eutriana barbata* Kunth, Rev. Gram. **1** (1829) 96; Enum. **1** (1833) 282; Miq. Fl. Ind. Bat. **3** (1859) 284; F.-Vill. Nov. App. (1883) 321. *Actinochloa barbata* R. et S. Syst. **2** (1817) 420.

BOUTELOUA TENUIS Griseb.; *Chondrosium tenue* Beauv. Agrost. (1812) 41; Kunth Enum. **1** (1833) 276; F.-Vill. Nov. App. (1883) 320.

BOUTELOUA SIMPLEX Lag.; *Chondrosium simplex* Kunth Enum. **1** (1833) 276; F.-Vill. Nov. App. (1883) 320.

POLYSCHISTIS PAUPERCULA Presl Rel. Haenk. **1** (1830) 294. *t. 41. f. 12;* Kunth Enum. **1** (1833) 282; Miq. Fl. Ind. Bat. **3** (1859) 384; F.-Vill. Nov. App. (1883) 321.

"Hab. in insula Luzonia" Presl. Erroneously localized by Presl, a species of tropical America, not of the Philippines=*Pentarrhaphis* sp.

Tribe XI. **FESTUCEÆ.**

Inflorescence in panicles or racemes or spike-like racemes. Spikelets two to many-flowered, rarely 1-flowered, usually perfect. Empty glumes usually shorter than the nearest flowering glume; flowering glumes awnless or awned.

(58) **PHRAGMITES** Trin.

Spikelets loosely many-flowered, the lowest flower staminate, the others usually perfect; empty and flowering glums glabrous, the rhachilla long-penicellate. Tall, reed-like grasses with spreading many-flowered panicles.

Species about 3, 1 cosmopolitan, 1 in South America, and 1 in tropical Asia and Malaya; 2 in the Philippines.

1. Culms mostly 1.5 to 2.5 high; panicles mostly about 30 cm. long or less .... (1) *P. vulgaris*
1. Culms frequently 5 m. high; panicles frequently 60 cm. long, the branches widely spreading........ (2) *P. karka*

(1) **Phragmites vulgaris** (Lam.) Trin. Fund. Agrost. (1820) 134; Pilger in Perk. Fl. Philip. (1904) 147. *P. communis* Trin. l. c.; Kunth Enum. **1** (1833) 251; Hook. f. Fl. Brit. Ind. **7** (1897) 303; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 409; Usteri Beitr. Kenn. Philip. Veg. (1905) 133. *Arundo tecta* Blanco Fl. Filip. ed. 1 (1837) 48; ed. 2 (1845) 33, non Walt. *Arundo phragmites* Linn. Sp. Pl. (1753) 81. *A. vulgaris* Lam. Fl. Franc. **3** (1778) 615. *Phragmites phragmites* Karst. Deutsch. Fl. (1880–83) 379.

LUZON, Manila (382 *Merrill*) August, 1902: Province of Principe, Baler (1123 *Merrill*) September, 1902: Province of Benguet, Baguio (5778 *Elmer*) March, 1904. MINDORO, Baco (1252 *Merrill*) January, 1903. CULION (465 *Merrill*) December, 1902.

Temperate, subtemperate and tropical regions of the World. T., *Tambo.*

(2) **P. karka** (Retz.) Trin. ex Steud. Nomen. ed. 2, **2** (1840) 324; Hook. f. Fl. Brit. Ind. **7** (1897) 304; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 410; Usteri Beitr. Kenn. Philip. Veg. (1905) 133; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 29. *P. roxburghii* Steud. l. c.; Nees in Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 173; Miq. Fl. Ind. Bat. **3** (1859) 412; F.-Vill. Nov. App. (1883) 321, excl. syn. Blanco. *Arundo karka* Retz. Obs. **4** (1779–91) 21.

LUZON, Province of Bataan, Lamao (3178 *Merrill*) October, 1903; (6851 *Elmer*) November, 1904.

Tropical Asia, Africa, Malaya, and Australia.

(59) NEYRAUDIA Hook. f.

Similar to the preceding but the lateral nerves of the flowering glume long-penicellate and the rhachilla short-hairy.

Species 1, tropical Africa to Asia and Malaya.

(1) **Neyraudia madagascarensis** (Kunth) Hook. f. Fl. Brit. Ind. **7** (1897) 305; Pilger in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 409. *Arundo madagascarensis* Kunth Rev. Gram. **1** (1829) 273. *t. 48;* Enum. **1** (1833) 247; F.-Vill. Nov. App. (1883) 321; Vidal Rev. Pl. Vasc. Filip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 293; Ceron Cat. Pl. Herb. (1892) 185.

PHILIPPINES (623 *Cuming*) fide Vidal; (4017 *Vidal*) fide Ceron. Not seen.

British India to southern China and Malaya, tropical Africa, and Madagascar.

(60) DIPLACHNE Beauv.

Spikelets narrow, many-flowered, arranged in spike-like racemes which are paniculately disposed. Flowering glumes 1-nerved, keeled, usually 2-toothed, the keel mucronate or awn pointed.

Species about 15, in the warmer parts of both hemispheres; 1 in the Philippines.

(1) **Diplachne fusca** (Linn.) Beauv. Agrost. (1812) 163; Hook. f. Fl. Brit. Ind. **7** (1897) 329; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 411. *Leptochloa ? fusca* Kunth Enum. **1** (1883) 271. *Festuca fusca* Linn. Sp. Pl. (1753) 109.

LUZON, Manila (*Merrill*) January, 1906: Province of Laguna, Los Baños (5104 *Merrill*) March, 1906.

Tropical Asia, Africa, Malaya, and Australia.

(61) **ERAGROSTIS** Host.

Panicles various, usually open. Spikelets usually densely many-flowered. Flowering glumes imbricate, strongly 3-nerved, keeled, acute.

Species about 125 in all warm countries; about 10 in the Philippines.

1. Rhachilla of spikelets more or less jointed and breaking up from above downward. (Sect. CATACLASTOS.)
2. Flowering glumes strongly acuminate .... (1) *E. lasioclada*
2. Flowering glumes acute or obtuse.
3. Panicles 10 cm. long or less.
4. Panicles open, rather lax .... (2) *E. tenella*
4. Panicles dense, spike-like, densely flowered; culm viscid below the panicle .... (3) *E. viscosa*
3. Panicles 20 to 40 cm. in length.
4. Panicle branches whorled, scarcely branched from the base; spikelets 6 to 10 flowered .... (4) *E. interrupta*
4. Panicle branches whorled and branched from the base, the branchlets capillary; spikelets 5-flowered or less .... (5) *E. japonica*
1. Rhachilla of spikelet tough, persistent; flowering glumes falling away from its base upward. (Sect. PTEROESSA.)
2. Spikelets flat, elliptical-ovate, the lateral nerves of the flowering glumes very prominent .... (6) *E. unioloides*
2. Spikelets linear to linear-oblong, compressed; nerves of the flowering glume prominent or not.
3. Panicle branches elongated, spreading or ascending.
4. Annual; spikelets pale .... (7) *E. distans*
4. Perennial; spikelets plumbeous.
5. Panicles about 20 cm. long; branches ascending .... (8) *E. elegantula*
5. Panicles 10 cm. long or less; branches usually divaricately spreading .... (9) *E. elongata*
3. Panicle branches short, appressed, densely flowered throughout, giving the panicle a spiciform appearance .... (10) E. *spartinoides*

(1) **Eragrostis lasioclada** Merrill, sp. nov. § *Cataclastos.*

Perennis; culmis erectis, ad 70 cm. altis, 3-nodis, simplicibus; vaginis quam internodiis brevioribus, marginibus sparse longe-pilosis; laminis anguste linearibus, acuminatis, 15–20 cm. longis, 2–3 mm. latis; paniculis oblongis, ad 15 cm. longis, rhachi ramis ramulis pedicellibusque sparse longe-pilosis, ramis inferioribus ad 4 cm. longis, erectis vel ascendentibus; spiculis oblongis, 6–7 mm. longis, 1 mm. latis, ad 5-floris; glumis sterilibus inaequalibus, 1-nervis, acutis vel acuminatis; glumis fertilibus 2.5–3.5 mm. longis, subulato-acuminatis.

A tufted erect perennial grass, the culms about 70 cm. tall, slender, simple, glabrous or slightly pilose; nodes 3, glabrous. Sheaths shorter than the internodes, compressed, the margins slightly long-pilose; ligule short, truncate; blades narrowly linear, plane or involute, acuminate, rigid, 15 to 20 cm. long, 2 to 3 mm. wide, slightly long-pilose, becoming glabrous. Panicles oblong, strict, narrow, about 15 cm. long, 1 to 2 cm. in diameter, the lower branches 4 cm. long, ascending or erect, the branches, branchlets, and pedicels with scattered long white hairs. Spikelets oblong, pale or purplish, about 5-flowered, 6 to 7 mm. long, 1 mm.

wide, the pilose pedicels 0.4 to 0.8 mm. long; empty glumes unequal, 1-nerved, acute or acuminate; ovate-lanceolate, the lower one 2 mm. long, the upper 2.5 mm. long; flowering glumes 2.5 to 3.5 mm. long, the upper ones longer than the lower, subulate-acuminate at the apex, with a prominent nerve on each side of the keel, the keel above and short awn scabrid. Palea 2 mm. long, linear-obovate, curved, deciduous, the keels ciliate.

CULION (416 *Merrill*) December, 1902. In old rice lands near sea level.

A species well characterized by its narrow panicles, sparsely long pilose sheaths, leaves and inflorescence, and acuminate flowering glumes. It may be the form credited to the Philippines by F.-Villar as *Eragrostis ciliata* Nees.

(2) **Eragrostis tenella** (Linn.) R. et S. Syst. **2** (1817) 576; Presl Rel. Haenk. **1** (1830) 274; Scribn. Rept. Mo. Bot. Gard. **10** (1899) 44. *pl. 44;* F.-Vill. Nov. App. (1883) 322; Pilger in Perk. Frag. Fl. Philip. (1904) 148; Hook. f. Fl. Brit. Ind. **7** (1897) 315. *E. plumosa* Link; F.-Vill. l. c. 322; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 293; Ceron Cat. Pl. Herb. (1892) 185; Usteri Beitr. Kenn. Philip. Veg. (1905) 132. *E. amabalis* O. Kuntze Rev. Gen. Pl. (1891) 773, non Wight et Arn. *Poa tenella* Linn. Sp. Pl. (1753) 69. *Cyperus paniculatus* Blanco Fl. Filip. ed. 1 (1837) 32; ed. 2 (1845) 22.

PHILIPPINES (714 *Cuming*). LUZON, Manila (*Hallier*) December, 1903; (6 *Merrill*) May, 1902: Province of Cagayan, Aparri (130 *Merrill*) June, 1902: Province of Cavite, Cavite (156 *Foxworthy*) July, 1905: Province of Union, Bauang (5681 *Elmer*) February, 1904: Province of Principe, Baler (1128 *Merrill*) September, 1902. PANAY, Iloilo (*Copeland*) January, 1904. PALAWAN, Puerto Princesa (4171 *Curran*) May, 1906. MINDANAO, Camp Overton (599 *Clemens*) June, 1906.

Tropical Asia, Africa, and Malaya.

Possibly the species credited to the Philippines by F.-Villar as *Eragrostis pilosa* Beauv., was a form of this species.

(3) **Eragrostis viscosa** (Retz.) Trin. in Mém. Acad. St. Pétersb. VI. **1** (1831) 397; Miq. Fl. Ind. Bat. **3** (1859) 392; F.-Vill. Nov. App. (1883) 322. *E. tenella* R. et S., var. *viscosa* Stapf in Hook. f. Fl. Brit. Ind. **7** (1897) 315; Pilger in Perk. Frag. Fl. Philip. (1904) 148. *Poa viscosa* Retz. Obs. **2** (1779–91) 20; Kunth Enum. **1** (1833) 336.

LUZON, Manila (371 *Merrill*) August, 1902.

Tropics of the Old World.

(4) **Eragrostis interrupta** (Lam.) Doell. in Mart. Fl. Bras. II. **3**: 157, non Beauv.; Usteri. Beitr. Kenn. Philip. Veg. (1905) 132; Pilger in Perk. Frag. Fl. Philip. (1904) 148 "Beauv." *Poa interrupta* Lam. Ill. **1** (1791) 185. *Eragrostis interrupta* var. *koenigii* Stapf. in Hook. f. Fl. Brit. Ind. **7** (1897) 316. *E. minutiflora* Presl Rel. Haenk. **1** (1830) 274.

LUZON, Province of Nueva Viscaya, Bayombong (122 *Merrill*) June, 1902: Province of Tayabas, Atimonan (708 *Whitford*) August, 1904. MINDORO, Baco River (214 *McGregor*) April, 1905. PALAWAN (1792 *Merrill*) February, 1903. BALABAC (468 *Mangubat*) March, 1906.

Tropical Asia, Africa, and Malaya.

Eragrostis interrupta Beauv., was based on *Poa interrupta* R. Br., which is a synonym of *Eragrostis elongata* Jacq., according to Hackel in lit. Lamarck's name is here accepted for the species.

(5) **Eragrostis japonica** (Thunb.) Trin. in Mém. Acad. St. Pétersb. VI. **1** (1830) 450: Hack. in Bull. Herb. Boiss. **7** (1899) 705. *E. tenuissima* Schrad. ex Nees Fl. Afr. Austral. (1841) 409, 410; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 393; Ceron Cat. Pl. Herb. (1892) 185. *E. interrupta* var. *tenuissima* Stapf in Hook. f. Fl. Brit. Ind. **7** (1897) 316; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 415. *E. aurea* Steud. Syn. **1** (1855) 266; Miq. Fl. Ind. Bat. **3** (1859) 394; F.-Vill. Nov. App. (1883) 322. *Vilfa verticillata* Steud. Syn. **1** (1855) 158? *Soporobolus verticillatus* Nees in Hook. Kew. Gard. Misc. **2** (1850) 101?; Miq. Fl. Ind. Bat. **3** (1859) 375. *Panicum leptanthum* Steud. Syn. **1** (1855) 79. *Poa japonica* Thunb. Fl. Jap. (1784) 31; Llanos Frag. Pl. Filip. (1851) 47. *P. amboinensis* F.-Vill. Nov. App. (1883) 322 non Linn., ex syn. Llanos.

PHILIPPINES (545, 1669 *Cuming*).

Tropical Asia to Japan.

(6) **Eragrostis unioloides** (Retz.) Nees ex Steud. Nom. ed. 2, **2** (1840) 364; F.-Vill. Nov. App. (1883) 322. *E. polymorpha* R. Br. Prodr. (1810) 180; Miq. Fl. Ind. Bat. **3** (1859) 394; F.-Vill. Nov. App. (1883) 322. *E. rubens* Lam.; F-Vill. l. c. 322. *E. amabalis* Wight et Arn. in Hook. et Arn. Bot. Beechy Voy. (1841) 251, excl. syn. Linn.; Hook. f. Fl. Brit. Ind. **7** (1897) 317.

LUZON, Province of Rizal (3423 *Ahern's collector*) November, 1905.

Tropical Africa, Asia, and Malaya.

(7) **Eragrostis distans** Hack. in Govt. Lab. Publ. **35** (1905) 81.

LUZON, Province of Benguet, Kias (6608 *Elmer*) June, 1904; District of Lepanto, Cervantes to Mancayan (4472 *Merrill*) November, 1905.

Endemic.

(8) **Eragrostis elegantula** (Kunth) Steud. Syn. **1** (1855) 266; Pilger in Perk. Frag. Fl. Philip. (1904) 322; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 412; Stapf. in Hook. f. Fl. Brit. Ind. **7** (1897) 318. *E. brownei* F.-Vill. Nov. App. (1883) 322; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1885) 283; Ceron Cat. Pl. Herb. (1892) 185. *E. luzoniensis* Steud. Syn. **1** (1855) 266; Miq. Fl. Ind. Bat. **3** (1859) 393; F.-Vill. Nov. App. (1883) 322. *Uniola paniculata* Llanos Frag. Pl. Filip. (1851) 32. *E. nigra* Usteri Beitr. Kenn. Philip. Veg. (1905) 132, non Nees?

PHILIPPINES (1416 *Cuming*). LUZON, Manila (4, 5, 9 *Scribner*) June, 1902: Province of Benguet, Baguio (5760 *Elmer*) March, 1904: District of Lepanto, Balili (4462 *Merrill*) November, 1905: Province of Nueva Ecija, Carranglang (245, 264 *Merrill*) May, 1902: Province of Nueva Viscaya, Quiangan (134 *Merrill*) June, 1902. SEMERARA (4155 *Merrill*) June, 1905. CULION (463 *Merrill*) December, 1902.

Tropical Asia to Malaya, Australia, and New Caledonia.

(9) **Eragrostis elongata** Jacq. Eclog. Gram. (1813) 3. *t. 3;* Presl Rel. Haenk. **1** (1830) 275; Hook. f. Fl. Brit. Ind. **7** (1897) 319; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 413. *E. cumingii* Steud. Syn. **1** (1855) 266; Miq. Fl. Ind. Bat. **3** (1859) 394; F.-Vill. Nov. App. (1883) 322. *E. zeylanica* Nees in Nov. Act. Nat. Cur. **19** (1843) Suppl. **1**: 204; Rolfe in Journ. Bot. **23** (1885) 216; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 283; Ceron Cat. Pl. Herb. (1892) 185; Pilger in Perk. Frag. Fl. Philip. (1904) 148. *E. brownei* Nees ex Steud. Nomen. ed. 2, **1** (1841) 562.

PHILIPPINES (672, 1104 *Cuming*). LUZON, Manila (8 *Scribner*) June, 1902: Province of Benguet, Baguio (4331 *Merrill*) November, 1905: Province of Union, Bauang (5707 *Elmer*) February, 1904: Province of Nueva Viscaya, Dupax (*Merrill*) May, 1902. CULION (686 *Merrill*) February, 1903.

Tropical Asia, Malaya, and Australia.

(10) **Eragrostis spartinoides** Steud. Syn. **1** (1855) 265; Pilger in Perk. Frag. Fl. Philip. (1904) 148.

PHILIPPINES (668 *Cuming*). LUZON, Province of Nueva Ecija, Carranglang (257 *Merrill*) May, 1902. SEMERARA (4149 *Merrill*) June, 1905.

Endemic.

In addition to the above species of Eragrostis, *E. megastachya* Link.=*E. major* Host., has been reported from the Philippines by Vidal, Phan. Cuming. Philip. (1883) 159; Rev. Pl. Vasc. Filip. (1886) 293; based on No. 1782 *Cuming*. The identification may have been erroneous. I have seen no specimens of this species from the Philippines.

(62) CENTOTHECA Desv.

Panicles expanded the spikelets small, the flowering glumes rounded on the back, 5 to 7-nerved, awnless but usually with hooked appendages or small protuberances on the keel. Erect broad-leaved sylvan grasses.

Species three, tropical Africa, Asia, Malaya, and Polynesia; one in the Philippines.

(1) **Centotheca malabarica** (Linn.). *Poa malabarica* Linn. Sp. Pl. (1753) 69. *Centotheca lappacea* Desv. in Nuov. Bull. Soc. Philom. **2** (1810) 189; Kunth Rev. Gram. **1** (1829) 317. *t. 70;* Enum. **1** (1833) 366; Presl Rel. Haenk. **1** (1830) 258; Miq. Fl. Ind. Bat. **3** (1859) 398; F.-Vill. Nov. App. (1883) 322; Vidal Rev. Pl. Vasc. Filip. (1886) 293; Phan. Cuming. Philip. (1885) 159; Hook. f. Fl. Brit. Ind. **7** (1897) 332; Pilger in Perk. Frag. Fl. Philip. (1904) 148; Rendle in Forbes & Hemsl. Journ. Linn. Soc Bot. **36** (1904) 419; Usteri Beitr. Kenn. Philip. Veg. (1905) 132; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 29; Schum. und Lauterb. Fl. Deutsch. Schutzgeb. Südsee (1901) 184. *Cenchrus lappaceus* Linn. Sp. Pl. ed. 2 (1763) 1488. *Centotheca latifolia* Trin. Fund. Agrost. (1820) 141; O. Kuntze Rev. Gen. Pl. (1891) 765. *Melica philippinensis* Llanos Frag. Pl. Filip. (1851) 44.

PHILIPPINES (552 *Cuming*). LUZON, Province of Union, Bauang (5644 *Elmer*) February, 1904: Province of Bataan, Lamao River (6649 *Elmer*) November, 1904; (3264 *Merrill*) October, 1903; (1018 *Whitford*) December, 1904: Province of Zambales, Subic (*Hallier*) December, 1903: Province of Nueva Viscaya, Dupax (246 *Merrill*) May, 1902: Province of Tayabas, Atimonan (658 *Whitford*) August, 1904; Malicboi (36 *Ritchie*) April, 1903: Province of Principe, Baler (1126 *Merrill*) September, 1902. SIBUYAN (10 *McGregor*) July, 1904. PANAY, Province of Antique (42 *Yoder*) December, 1904. CULION (494 *Merrill*) December, 1902. PALAWAN, Puerto Princesa (342 *Bermejos*) January, 1906. BALABAC (431, 515 *Mangubat*) March, 1906. MINDANAO, Lake Lanao, Camp Keithley (264 *Clemens*) February, 1906.

Tropical Africa, Asia, Malaya, Polynesia, and Australia.

(63) LOPHATHERUM Brongn.

Spikelets often two-ranked, sessile on the branches of the panicle, linear, 1-flowered, with a tuft of sterile glumes at the apex; empty glumes two; flowering glumes, pointed or short awned.

Species three, British India to Japan and Malaya; one in the Philippines.

(1) **Lophatherum gracile** Brongn. in Duperry Voy. Coqu. Bot. (1829) 50. *t. 8;* Kunth Enum. **1** (1833) 391; Steud. Syn. **1** (1855) 300; F.-Vill. Nov. App. (1883) 323; Hook. f. Fl. Brit. Ind. **7** (1897) 331; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 420; Pilger in Perk. Frag. Fl. Philip. (1904) 148.

LUZON, Province of Nueva Ecija, Caraballo Sur Mountains (210 *Merrill*) May, 1902.

British India to southern China and Japan and Malaya.

(64) **POA** Linn.

Spikelets 2 to 6-flowered in open panicles. Rhachilla and callus as well as the marginal nerves of the flowering glumes often clothed with long soft hairs; all the glumes awnless.

Species about 140, chiefly of temperate and cold countries, a few on the high mountains in the Tropics; two in the Philippines.

1. First and second glumes distinctly shorter than the flowering glumes; keel and nerves silky-ciliate below .... (1) *P. annua*
1. Second glume equaling the flowering glumes; keel silky-hairy below, the nerves glabrous .... (2) *P. luzoniensis*

(1) **Poa annua** Linn. Sp. Pl. (1753) 68; Steud. Syn. **1** (1855) 250; F.-Vill. Nov. App. (1883) 322; Llanos Frag. Pl. Filip. (1851) 47; Hook. f. Fl. Brit. Ind. **7** (1897) 345; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 422; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 181.

LUZON, Province of Benguet, Bued River (4288 *Merrill*) November, 1905. Introduced.

Widely distributed, chiefly in temperate and subtropical regions.

(2) **Poa luzoniensis** Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 180.

LUZON, Province of Benguet, Pauai (4712 *Merrill*) November, 1906.

Endemic.

(65) **BROMUS** Linn.

Spikelets paniculate, usually large. Flowering glumes 5 to 9-nerved, usually 2-toothed, awned or awnless, the awn never geniculate. Ovary with a hairy cushion-like appendage on the summit.

Species about 60, most abundant in the north temperate zone, a few in temperate South America and a few in the Tropics; one or two in the Philippines.

(1) **Bromus pauciflorus** (Thunb.) Hack. in Bull. Herb. Boiss. **7** (1899) 713 et II, **3** (1903) 506; Rendle in Forbes & Hemsl. Journ. Linn. Soc. Bot. **36** (1904) 430. *Festuca pauciflora* Thunb. Fl. Jap. (1784) 52.

LUZON, Province of Benguet, Pauai (4714 *Merrill*) November, 1906.

China, and Japan.

The form here referred to *Bromus pauciflora* may prove to be a distinct species when more material is available for study and comparison.

DOUBTFUL SPECIES.

BROMUS PALLENS Cav. Icon. **6** (1801) 66. *t. 591. f. 1;* Kunth Enum. **1** (1833) 418; Miq. Fl. Ind Bat. **3** (1859) 398; F.-Vill. Nov. App. (1883) 322

"Habitat in Manilae viciniis, ibique *Acanthus ilicifolius*, Nee legit." Cavanilles.

I have seen no specimens that agree with Cavanilles's description and figure. Possibly described from an introduced plant, or from one erroneously localized.

BROMUS LUZONIENSIS Presl Rel. Haenk. **1** (1830) 262. *Triticum luzoniensis* Kunth Enum. **1** (1833) 446; Miq. Fl. Ind. Bat. **3** (1859) 402; F.-Vill. Nov. App. (1883) 323.

"Hab. in Luzonia" Presl.

Probably of American and not Philippine origin, erroneously localized.

(66) **BRACHYPODIUM** Beauv.

Spikelets many-flowered, narrow, cylindrical, in simple racemes, very short-pedicellate. Flowering glumes usually awned from the point, 7 to 9-nerved. Palea with stiff-fringed keels.

Species about 6 in Europe and temperate Asia and in the mountains of tropical Asia, and Africa; one in Luzon.

(1) **Brachypodium silvaticum** Beauv. Agrost. (1812) 146, subspec. **luzoniense** Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 269.

LUZON, Province of Benguet, Mount Tonglon (4830 *Merrill*) November, 1905; Pauai (4710 *Merrill*) November, 1905: District of Lepanto, Mount Data (4536 *Merrill*) November, 1905.

Endemic, i. e., the subspecies, the species widely distributed in Europe, northern Asia and the mountains of India, China, and Japan.

(2) **Brachypodium silvaticum** Beauv. var. **asperum** Hack. in Philip. Journ. Sci. **1** (1906) Suppl. 269.

LUZON, Province of Benguet, Pauai to Baguio (4698 *Merrill*) November, 1905.

Endemic.

Tribe XII. **HORDEÆ.**

Spikelets one to many-flowered, sessile on teeth or notches of the rhachis, forming a spike.

(67) **MONERMA** Beauv.

Spikes cylindrical, subulate, articulated. Spikelets deeply immersed in the rhachis, awnless, the terminal with two, the others with one empty glume, these coriaceous. Flowering glumes membranous.

Species three, southern Europe and Africa to tropical Asia, Malaya, Australia and Polynesia; one in the Philippines. A maritime grass.

(1) **Monerma repens** (Forst.) Beauv. Agrost. (1812) 117; Hack. in Govt. Lab. Publ. **35** (1905) 81. *Rottboellia repens* Forst. f. Prodr. (1797) 9. *Lepturus repens* R. Br. Prodr. (1810) 207; Kunth Enum. **1** (1833) 463; Steud. Syn. **1** (1855) 357; Hook. f. Fl. Brit. Ind. **7** (1897) 365.

MINDORO, Puerto Galera (3331 *Merrill*) October, 1905. CULION (606 *Merrill*) December, 1902. CAJOAGAN (5245 *Merrill*) October, 1906. PALMAS (5354 *Merrill*) October, 1906.

Ceylon to Malaya, Polynesia, and Australia.

(68) **TRITICUM** Linn.

Spikes with a terminal spikelet, the rhachis articulate, the lowest 1 to 4 spikelets smaller than the others, awnless, sterile. Fertile spikelets inflated or ventricose, 2 to 5-flowered.

Species about 15, Europe, temperate Asia and America; 1, wheat, rarely cultivated in the Philippines.

(1) **Triticum vulgare** Vill. Hist. Pl. Dauph. **2** (1779) 153; F.-Vill. Nov. App. (1883) 323; Vidal Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 284.

LUZON, Province of Benguet (4768 *Merrill*) November, 1906.

Wheat, rarely cultivated in the Philippines, not spontaneous.

(I have also specimens of *Hordeum sativum* L., var. *vulgare*, from plants cultivated in Benguet Province (No. 4746 *Merrill*), but like the preceding species this can not be considered a constituent of the Philippine flora.

Tribe XIII. **BAMBUSEÆ.**

Large, often tree-like perennial grasses, sometimes scandent. Spikelets 2 to 8 or sometimes 1-flowered, in panicles or racemes, mostly in tufts or clusters at the nodes of the panicle branches. Empty glumes two to several, increasing in size upwards, shorter than the flowering glumes. Flowering glumes awnless terminal awn. Palea two to many nerved, rarely nerveless.

(69) **BAMBUSA** Schreb.

Spikelets with 2 to 6 empty glumes, gradually increasing in size and becoming like the flowering glumes. Spikelets 2 to many-flowered. Ovary hairy. Usually tall arborescent shrubs, rarely climbers.

Species about 60 in the tropical region of both hemispheres, the Philippine representatives, from lack of material in flower and fruit not well understood.

From Blanco's descriptions and the scanty imperfect material of this genus at present available, it is impossible to make a satisfactory key to the species.

(1) **Bambusa blumeana** Schultes f. Syst. Veg. **7**^{2} (1830) 1343; Munro in Trans. Linn. Soc. **26** (1868) 101; Kunth Enum. **1** (1833) 431; F.-Vill. Nov. App. (1883) 323; Rendle in Ann. Bot. Gard. Calcutta **7** (1896) 50. *pl. 47;* Vidal Cat. Pl. Prov. Manila (1880) 47; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 29. *Bambus pungens* Blanco Fl. Filip. ed. 1 (1837) 270. Miq. Fl. Ind. Bat. **3** (1859) 421. *Bambus arundo* Blanco l. c. ed. 2 (1845) 188.

The commonly cultivated bamboo of the Philippines, perhaps not a native species. Not seen in flower. T., *Cauayan totoo, Cauayan.*

Malayan Peninsula and Archipelago.

Probably the species credited to the Philippines by F.-Villar as *Bambusa arundinacea* was a form of the above. The figure of *Bambusa arundinacea* given by Vidal, Sinopsis, Atlas. (1883) *t. 96. f. A.* was copied from Beddome's figure, and not drawn from Philippine material, teste Vidal l. c. p. 42.

(2) **Bambusa levis** Blanco Fl. Filip. ed. 1 (1837) 272; ed. 2 (1845) 189; Miq. Fl. Ind. Bat. **3** (1859) 421. *Dendrocalamus flagellifer* F.-Vill. Nov. App. (1883) 324 ex syn. Blanco, non Munro.

An endemic (?) species of uncertain value, known only from Blanco's description. T., *Cauayang boo.*

(3) **Bambusa lima** Blanco Fl. Filip. ed. 1 (1837) 271; ed. 2 (1845) 189; Miq. Fl. Ind. Bat. **3** (1859) 421; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 29. *Bambusa longinodis* F.-Vill. Nov. App. (1883) 323 non Miq.?

Represented by the following sterile specimens. LUZON, Province of Bataan, Lamao (*Whitford*) September, 1905: Province of Pampanga, Arayat (1409 *Merrill*) March, 1903.

An endemic (?) species of uncertain value, characterized by its very long internodes. T., *Anós.*

(4) **Bambusa luconiae** Munro in Trans. Linn. Soc. **26** (1868) 115; F.-Vill. Nov. App. (1883) 323.

"Hab. in ins. Philip. Luçonia, montibus Mahaihai! Wilkes" Munro.

Described from sterile specimens and unrecognizable from the description alone.

(5) **Bambusa lumampao** Blanco Fl. Filip. ed. 1 (1837) 373; ed. 2 (1845) 189; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 29; Miq. Fl. Ind. Bat. **3** (1859) 421. *Dendrocalamus membranaceus* F.-Vill. Nov. App. (1883) 324 ex syn. Blanco, non Munro.

LUZON, Province of Nueva Viscaya, Quiangan (126 *Merrill*) June, 1902: Province of Bataan, Lamao (*Whitford*) September, 1905: Dinalupijan (*Merrill*) January, 1903: Province of Pampanga, Arayat (*Merrill*) March, 1903.

An endemic (?) not well-known species, all the above specimens being sterile with the exception of the first which unfortunately has only very old flowers. Possibly referable to *Schizostachyum.* T., *Lumampao, Bocaui* (Blanco). Sp.-Fil. *Caña boho.*

(6) **Bambusa monogyna** Blanco Fl. Filip. ed. 1 (1837) 286; ed. 2 (1845) 187; Miq. Fl. Ind. Bat. **3** (1859) 420; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 29. *Dendrocalamus strictus* F.-Vill. Nov. App. (1883) 324, ex syn. Blanco, non Nees.

Apparently represented by the following sterile specimens: LUZON, Province of Bataan, Dinalupijan (*Merrill*) January, 1903; Lamao (*Whitford*) September, 1905: Province of Pampanga, Arayat (*Merrill*) March, 1903.

An endemic (?) species of uncertain value. T., *Cauayan quiling.*

(7) **Bambusa nana** Roxb. Hort. Beng. (1814) 25; Gamble in Ann. Bot. Gard. Calcuta **7** (1896) 40. *pl. 38;* F.-Vill. Nov. App. (1883) 323; Usteri Beitr. Kenn. Philip. Veg. (1905) 133.

Occasionally cultivated as a hedge plant in Manila and probably in other towns in the Archipelago, a native of China and Japan. I have seen no Philippine specimens in flower or fruit. It is possible that the species credited to the Philippines by F.-Villar as *Bambusa tuldoides* was the same. F.-Villar states that he saw only cultivated specimens.

(8) **Bambusa blancoi** Steud. Syn. **1** (1855) 331; Miq. Fl. Ind. Bat. **3** (1859) 421. *Bambusa mitis* Blanco Fl. Filip. ed. 1 (1837) 271; ed. 2 (1845) 188, non Poir.; *Dendrocalamus sericeus* F.-Vill. Nov. App. (1883) 324, ex syn. Blanco, non Munro.

An endemic (?) species of uncertain value, known only from Blanco's description. T., *Tiauanac.*

(9) **Bambusa textoria** Blanco Fl. Filip. ed. 1 (1837) 270; ed. 2 (1845) 188; Miq. Fl. Ind. Bat. **3** (1859) 421. *Gigantochloa atter* F.-Vill. Nov. App. (1883) 323, ex syn. Blanco, non Kurz.

An endemic (?) species of uncertain value, known from Blanco's description. T., *Calbang.*

It is probable that by no means all of the above species are *Bambusa,* but that some of them are referable to other genera such as *Dendrocalamus, Gigantochloa,* etc., but it is quite impossible to determine Blanco's species and refer them to their proper genera without complete material, and it is probable that we shall be quite unable to locate some of the species absolutely. In addition to the above species, several others are represented in our herbarium, which from lack of complete material it is impossible to determine satisfactorily at this time.

(70) **GIGANTOCHLOA** Kurz.

Differing from *Bambusa* in having the filaments united into a tube, hence monadelphous. Tall arborescent species with numerous dense fascicles of spikelets in branched panicles.

Species about 10, British India and Malaya; one in the Philippines.

(1) **Gigantochloa scribneriana** Merrill sp. nov.

Frutex; ramis teretibus: foliis oblongo-lanceolatis, acuminatis, 25–30 cm. longis, 3–5 latis, ad marginem et nonnunquam supra nervos marginales serrulato-scabris, subtus pallidis et sparse pubescentibus; paniculis ut videtur 2 vel 3 metralis, aphyllis; ramis solitariis vel fasciculatis, elongatis, ad 80 cm. longis, glabris vel puberulis; spiculis ad ramulus floriferos fasciculatis, oblongo-ovatis, acutis, 1–1.5 cm. longis, fasciculis 1–4 cm. distantibus; glumis sterilibus 2 vel 3, bracteolis supremis eis similibus nec non paullo brevioribus; glumis fertilibus 4–6, plus minus 9 mm. longis, superioribus quam inferioribus longioribus, apice abrupte breviter acuminatis vel acutis, pubescentibus; staminibus 6; filamentis in tubo connatis; antheris linearibus, exsertis.

Erect, apparently of large size. Branches terete. Leaves oblong-lanceolate, acuminate, somewhat narrowed below to the petiole, 25 to 30 cm. long, 3 to 3.5 cm. wide, the margins and sometimes the marginal nerves above serrulate-scabrous, beneath pale and somewhat pubescent, the nerves on both sides of the midrib 8 or 9; petiole 3 to 5 mm. long; sheaths glabrous or slightly puberulous, the mouth glabrous; ligule very short, truncate. Panicles apparently 2 or 3 m. long, leafless, the branches solitary or fascicled, elongated, about 80 cm. long, glabrous or puberulous, the bracts coriaceous, oblong or ovate-oblong, acute or acuminate, glabrous. Spikelets in fascicles of three to eight, the internodes 1 to 4 cm. long, the bracteoles broadly triangular-ovate, acute, coriaceous, 5 mm. long; spikelets oblong-ovate, acute or slightly acuminate, compressed, 1 to 1.5 cm. long; empty glumes 2 or 3, similar to the upper bracteoles but slightly shorter, broadly ovate, acute or apiculate, slightly pubescent, the margins ciliate; flowering glumes 4 to 6, broadly ovate, about 9 mm. long, 7 mm. wide, coriaceous, the apex short apiculate or acute, pubescent, the margins ciliate, the upper ones longer than the lower and the uppermost enclosing an imperfect flower. Palea slightly shorter than the glumes, the two keels ciliate. Stamens 6; filaments united into a tube; anthers linear, exserted, 7 to 8 mm. long, glabrous, apiculate. Ovary pilose; style elongated, pilose.

CUYO (14 *F. Lamson-Scribner*) December, 1902.

The material is rather imperfect, there being no culm sheaths with the specimen, and no notes as to the size of the culms or the length of the inflorescence. It does not agree with any of the species of *Bambusa* described by Blanco, so far as I can determine from Blanco's descriptions. It is well characterized by its somewhat glaucous and slightly pubescent leaves, elongated panicle branches and somewhat pubescent spikelets, there being from three to eight spikelets in each fascicle.

(71) SCHIZOSTACHYUM Nees.

Spikelets 1-flowered, narrow-lanceolate, in remote, often dense fascicles along the panicle branches. Empty glumes 4 to 6, acuminate, gradually larger upwards. Stamens 6, free. Erect or scandent shrubs with slightly branched or simple infloresence.

Species about 15, southern Asia to Malaya, Polynesia, and the Sandwich Islands; three or more in the Philippines.

1. Mouth of leaf-sheaths long-ciliate .... (1) *S. acutiflorum*
1. Mouth of leaf-sheaths glabrous .... (2) *S. dielsianum*

(1) **Schizostachyum acutiflorum** Munro in Trans. Linn. Soc. **26** (1868) 137; F.-Vill. Nov. App. (1883) 324; Vidal Rev. Pl. Vasc. Filip. (1886) 294; Phan. Cuming. Philip. (1885) 159; Ceron Cat. Pl. Herb. (1892) 168. *Dinochloa major* Pilger in Perk. Frag. Fl. Philip. (1904) 149. *Schizostachyum blumei* F.-Vill. Nov. App. (1883) 324? non Nees. *Dinochloa diffusa* Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 29 pro parte.

PHILIPPINES (544 *Cuming*). LUZON, Province of Bataan, Lamao River (75, 519 *Whitford*) April, July, 1904; (1261, 2731 *Borden*) July, 1904, March, 1905; (2550, 3297 *Merrill*) June, October, 1903; Dinalupijan (1477, 1474, 1528 *Merrill*) January, February, 1903. MINDORO, Bongabong River (3740 *Merritt*) March, 1906.

Endemic.

I am not able to distinguish *Dinochloa major* Pilger from *Schizostachyum acutiflorum* Munro, duplicate types of both species being before me. I consider the plant to be a *Schizostachyum* rather than a *Dinochloa*.

(2) **Schizostachyum dielsianum** (Pilger). *Dinochloa dielsiana* Pilger in Perk. Frag. Fl. Philip. (1904) 148. *Dinochloa diffusa* Merr. in Govt. Lab. Publ. **29** (1905) 7; Philip. Sci. **1** (1906) Suppl. 29, pro parte. *Bambusa diffusa* Blanco Fl. Filip. ed. 1 (1837) 289; ed. 2 (1845) 287; ed. 3, **1** (1877) 334?

LUZON, Province of Pampanga (1408 *Merrill*) March, 1903: Province of Zambales (388 *Maule*) March, 1904: Province of Bataan, Mount Mariveles (6092 *Leiberg*) July, 1904. MINDORO, Baco River (279 *McGregor*) April, 1905. PALAWAN (Paragua) (711 *Merrill*) February, 1903; (3548 *Curran*) January, 1906.

Endemic.

A species very close to the preceding, distinguished mainly by its glabrous, not long fimbriate sheath apices, and a *Schizostachyum* rather than a *Dinochloa*. I had previously taken up Blanco's specific name *diffusa* for this species, and may have been correct in doing so, but as his description apparently applies as well to the preceding species as to the present one, it is perhaps best to discard *Bambusa diffusa* as an unrecognizable species.

(3) **Schizostachyum** sp.

LUZON, Province of Benguet, Sablan (6173 *Elmer*) April, 1904: Province of Cagayan, Tuguegarao (*Williamson*) February, 1906.

An undescribed species, teste Hackel in lit.

In addition to the above species, two or three others of this genus are represented in our herbarium by imperfect material.

(72) **DINOCHLOA** Buse.

Spikelets very small, 1-flowered, in distant small fascicles or scattered along the branches of a very large panicle. Empty glumes 3 or 2, obtuse. Flowering glume one, similar to the empty glumes. A scandent shrub.

Species two, Malayan Peninsula and Archipelago; one in the Philippines.

(1) **Dinochloa scandens** (Blume) O. Kuntze Rev. Gen. Pl. (1891) 773. *Bambusa scandens* Blume ex Nees in Flora **7** (1824) 291. *Nastus tjangkorreh* Schultes Syst. Veg. **7**^{2} (1830) 1358; Kunth Enum. **1** (1833) 430; Steud. Syn. **1** (1855) 333. *Dinochloa tjankorreh* Büse in Miq. Pl. Jungh. (1855) 388; Miq. Fl. Ind. Bat. **3** (1859) 415; F.-Vill. Nov. App. (1883) 324; Munro in Trans. Linn. Soc. **26** (1868) 153. *pl. 5;* Vidal Cat. Pl. Prov. Manila (1880) 48; Sinopsis Atlas (1883) *t. 96. f. C.;* Phan. Cuming. Philip. (1885) 159; Rev. Pl. Vasc. Filip. (1886) 294; Ceron Cat. Pl. Herb. (1892) 186; Pilger in Perk. Frag. Fl. Philip. (1904) 150; Merr. in Philip. Journ. Sci. **1** (1906) Suppl. 29; Gamble in Ann. Bot. Gard. Calcutta **6** (1896) 112.

PALAWAN, Puerto Princesa (276 *Bermejos*) January, 1906; Casuarina Point (621 *Foxworthy*) March, 1906. BALABAC (447 *Mangubat*) March, 1906. BASILAN (2977, 3980, 3981 *Hutchinson*) February, 1906. MINDORO, Bongabong River (3701, 4066 *Merritt*) March, 1906. MINDANAO, Davao (1239 *Copeland*) April, 1904: Province of Surigao (319 *Bolster*) April, 1906.

Malaya.

Var. **angustifolia** (Hackel) *D. tjankorreh* var. *angustifolia* Hack. in herb.

Foliis parvis, 4 ad 17 cm. longis, 0.5 ad 1.5 cm. latis.

PHILIPPINES (637 *Cuming*). LUZON, Province of Bataan, Lamao (2102 *Borden*) November, 1904: Province of Laguna, Mount Maquiling (5145 *Merrill*) March, 1906. MINDORO, Pola (2224 *Merrill*) May, 1903. MINDANAO, District of Davao, Todaya (1239 *Copeland*) April, 1904. BASILAN (*Hallier*) January, 1904.

Distinguished from the type by its very much smaller leaves, but intermediate forms occur. Munro gives leaf measurements that include this narrow-leaved form in the species, but the measurements given by Gamble do not include it.

DOUBTFUL AND EXCLUDED SPECIES OF BAMBUSEÆ.

BEESHA RHEEDII Kunth; Vidal Cat. Pl. Prov. Manila (1880) 48; F.-Vill. Nov. App. (1883) 324. Above records for this species from the Philippines never verified, probably erroneous identifications=*Melocanna bambusoides* Trin., a species of British India and one not to be expected in the Philippines.

CEPHALOSTACHYUM CAPITATUM Munro. Credited to the Philippines by F.-Villar, Nov. App. (1883) 324. A species of British India, not to be expected in the Philippines.

DENDROCALAMUS GIGANTEUS Munro. Credited to the Philippines by F.-Villar Nov. App. (1883) 324, who states that he saw cultivated specimens. Possibly cultivated in the Philippines, but if so, rarely. The "giant bamboo" of British India.

DENDROCALAMUS LATIFORUS Munro. Credited to the Philippines by F.-Villar Nov. App. (1883) 324, who states that he saw cultivated specimens. A species of Formosa, southern China, and Burma, F.-Villar's record from the Philippines not verified. The figure given by Vidal Sinopsis Atlas (1883) *t. 96. f. B.* was not drawn from Philippine material, but was copied from the plate in Munro's monograph, teste Vidal l. c. p. 42.

OXYTENANTHERA sp. Ceron Cat. Pl. Herb. (1892) 185. An undetermined species of which I have seen no specimens.

○

ERRATA.

Page 2, line 23, for lithographic read lithologic.
Page 9, line 32, for *Simplocaceæ* read *Symplocaceæ*.
Page 20, line 10, for **flossiger** read **flocciger**.
Page 22, line 16, for Malay read Malaya.
Page 86, line 14, for **P.** read **T.**
Page 91, line 24, for **N.** read **M.**
Page 97, line 14, for *cumingiana* read *duodecandra*.
Page 101, line 13, for **cumingii** read **perrottetiana**.
Page 170, line 30, for Luzon read the Philippines.
Page 277, line 15, for Strinz read Streinz.
Page 279, line 17, for DITHIDEALES read DOTHIDEALES.
Page 281, line 39, for USTALAGINALES read USTILAGINALES.
Page 285, for Deadalia and Daedalia read Daedalea.
Page 287, line 6, for **HAPLOPILUS** read **HAPALOPILUS.**
Page 287, line 29, for **GLEOPHYLLUM** read **GLOEPHYLLUM.**
Page 290, line 11, for AGARACALES read AGARICALES.
Page 292, line 28, for **DEUTERONYCETÆ** read **DEUTEROMYCETÆ.**

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VOL. I DECEMBER 31, 1906 SUPPLEMENT V

THE PHILIPPINE
JOURNAL OF SCIENCE

EDITED BY

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PUBLISHED BY

THE BUREAU OF SCIENCE
OF THE
GOVERNMENT OF THE PHILIPPINE ISLANDS

MANILA
BUREAU OF PRINTING
1906

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1890.—Memoria descriptiva de los manantiales minero-medicinales de la Isla de Luzon, estudiados por la comisión compuesta de los Señores D. José Centano, Ingeniero de Minas y Vocal Presidente, D. Anacleto del Rosario y Sales, Vocal Farmacéutico, y D. José de Vera y Gómez, Vocal Médico.

1893.—Estudio Descriptivo de algunas manantiales minerales de Filipinas ejecutado por la comisión formada por D. Enrique Abella y Casariego, Inspector General de Minas, D. José de Vera y Gómez, Médico, y D. Anacleto del Rosario y Sales, Farmacéutico; precedido de un prólogo escrito por el Excmo. Sr. D. Angel de Avilés, Director General de Administración Civil.

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1905, Bulletin No. 5.—The Coal Deposits of Batan Island. Warren D. Smith, B. S., M. A., Geologist.

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[1] The first four bulletins in the ornithological series were published by The Ethnological Survey under the title "Bulletins of the Philippine Museum." The other ornithological publications of the Government appeared as publications of the Bureau of Government Laboratories.

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